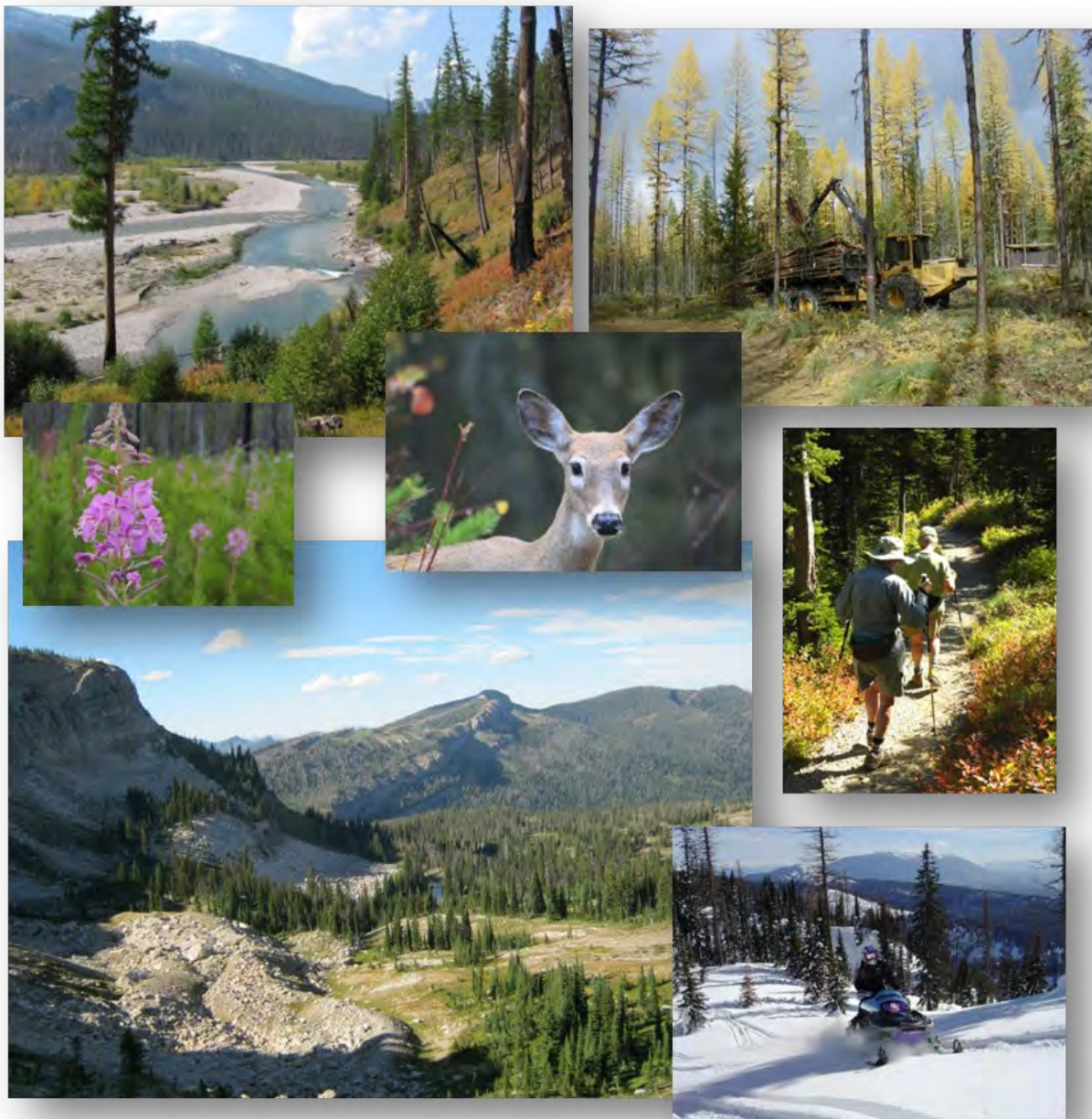




United States Department of Agriculture

Flathead National Forest Land Management Plan

Flathead, Lake, Lewis and Clark, Lincoln, Missoula, and Powell Counties, Montana



Forest Service

Northern Region

November 2018

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

Cover (images described clockwise from upper left):

- South Fork of the Flathead River, Spotted Bear Ranger District
- Forwarder working on the Paint Emery Resource Management Project, Hungry Horse-Glacier View Ranger District
- Two hikers
- Snowmobiler
- View from trail to Pentagon Cabin in the Bob Marshall Wilderness (photo by Peter Borgesen)
- Fireweed
- White-tailed deer (photo by John Littlefield)

Flathead National Forest

Land Management Plan

**Flathead, Lake, Lewis and Clark, Lincoln, Missoula, and Powell Counties,
Montana**

Lead Agency: USDA Forest Service

Responsible official: Chip Weber, Forest Supervisor
Flathead National Forest
650 Wolfpack Way
Kalispell, MT 59901
406-758-5204

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Number	Title
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List of Abbreviations

CFR	Code of Federal Regulations
d.b.h.	diameter at breast height
DC	desired condition (forest plan component)
DCA	demographic connectivity area
FW	forestwide (forest plan component)
GA	geographic area
GDL	guideline (forest plan component)
GIS	geographic information system
MA	management area
MFWP	Montana Fish, Wildlife and Parks
NCDE	Northern Continental Divide Ecosystem
NFS	National Forest System
PCA	primary conservation area
PIBO	Pacific Fish Strategy/Inland Native Fish Strategy biological opinion
PVT	broad potential vegetation type
STD	standard (forest plan component)
TMDL	total maximum daily load
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

Preface

The word conservation was a term that Gifford Pinchot brought into everyday usage. As first Chief of the Forest Service, and America's leading advocate of environmental conservation for over fifty years, Pinchot defined conservation as the "the foresighted utilization, preservation, and/or renewal of forests, waters, lands, and minerals for the greatest good of the greatest number for the longest time." The purpose of conservation is to make this land the best possible place to live, both for us and our descendants, and to do so in a way as not to impair or degrade those very resources from which our sustenance and quality of life is derived.

Chapter 1. Introduction

The Flathead National Forest Land Management Plan is referred to as the "forest plan" throughout this document. For ease of discussion throughout this document, the Flathead National Forest will be referred to as "the Forest" when referencing the single administrative unit, the staff that administers the unit, or the National Forest System (NFS) lands within the unit.

The forest plan provides an integrated set of management direction (or plan components) that provide for the social, economic, and ecological sustainability and multiple uses of the Forest's lands and resources. In May 2012, the U.S. Department of Agriculture began using new planning regulations, commonly called the 2012 planning rule, to guide collaborative and science-based revision of forest plans that promote the ecological integrity of national forests while considering social and economic sustainability.

The forest plan provides guidance for project- and activity-level decisionmaking on the Forest for approximately the next 15 years. This guidance includes:

1. forestwide components to provide for integrated social, economic, and ecological sustainability and ecosystem integrity and diversity as well as ecosystem services and multiple uses; components must be within Forest Service authority and consistent with the inherent capability of the plan area (36 Code of Federal Regulations (CFR) § 219.7 and CFR § 219.8–219.10);
2. recommendations to Congress 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 CFR § 219.7(2)(v) and (vi));
3. the plan area's distinctive roles and contributions within the broader landscape;
4. identification or recommendation of other designated areas (36 CFR § 219.7 (c)(2)(vii));
5. identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 CFR § 219.7(c)(2)(vii) and § 219.11),
6. identification of the maximum quantity of timber that may be removed from the plan area (36 CFR § 219.7 and § 219.11 (d)(6)),
7. identification of geographic area- or management area-specific components (36 CFR § 219.7 (c)(3)(d),
8. identification of watersheds that are a priority for maintenance or restoration (36 CFR § 219.7 (c)(3)(e)(3)(f), and
9. a plan monitoring program (36 CFR § 219.7 (c)(2)(x) and § 219.12).

Forest Plan Structure

The forest plan is designed to communicate the concepts of strategic guidance and adaptive management for the Forest. The forest plan is organized into several major divisions:

Chapter 1: Introduction

Chapter 2: Forestwide Direction

Chapter 3: Management Area Direction

Chapter 4: Geographic Area Direction

Chapter 5: Monitoring Program

Glossary

Appendix A—Northern Rockies Lynx Management Direction

Appendix B—Maps

Appendix C—Potential Management Approaches and Possible Actions

Appendix D—Potential Vegetation Types

Appendix E—Watershed Condition Framework and Conservation Watershed Network

Appendix F—Scenic Character Descriptions

Appendix G—Factors for Recommended Wilderness Areas

Implementing the forest plan

The forest plan provides a framework and management direction that guides resource management. The forest plan does not authorize projects, activities or site-specific prohibitions or commit the Forest Service to take action. The plan may constrain the Forest from authorizing or carrying out projects and activities, or the manner in which they may occur. Project or activity decisions will need to be made following appropriate procedures. For example, site-specific analysis in compliance with the National Environmental Policy Act will need to be conducted in order for prohibitions or activities to take place on the ground, in compliance with the broader direction of the forest plan.

The Forest will follow all laws, regulations, and policies that relate to managing NFS land. The forest plan is designed to supplement, not replace, direction from these sources. Other Forest Service direction, including laws, regulations, policies, executive orders, and Forest Service directives (manual and handbook), are not repeated in the forest plan.

When analyzing a proposed project or activity, the Forest planning team should:

- 1) identify the forestwide plan components (desired conditions, objectives, standards, and guidelines) that apply to the proposed project (see chapter 2),
- 2) identify the plan components that apply to the management area(s) potentially affected by the proposed project (see chapter 3), and

- 3) identify the plan components that apply to the geographic area(s) potentially affected by the proposed project (see chapter 4).

Project and activity consistency with the forest plan

As required by the National Forest Management Act of 1976 and the 2012 planning rule, all projects and activities authorized by the Forest Service after the record of decision for the forest plan must be consistent with the applicable plan components (16 U.S.C. 1604 (i)) as described at 36 CFR § 219.15 (c and d)). 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 CFR § 219.15(d)):

1. **Desired conditions and objectives.** The project or activity contributes to the maintenance or attainment of one or more desired conditions or objectives or does not foreclose the opportunity to maintain or achieve any 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 occurs 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.

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 (36 CFR § 219.15(c)):

- 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, or
- 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 only to the project or activity.

Plan Elements

Elements of the forest plan are

- forestwide, management area, and geographic area desired conditions, objectives, standards, and guidelines (chapters 2, 3, 4, and appendix A);
- the suitability of lands for specific multiple uses, including those lands suitable for timber production (chapter 3, suitability determinations by management areas);
- an estimate of the long-term sustained yield and projected timber sale quantity (chapter 2, production of natural resources);

- a description of the plan area's distinctive roles and contributions within the broader landscape (chapter 1);
- the identification of priority restoration watersheds (appendix E);
- proposed management actions and strategies that may occur on the plan area over the life of the plan (appendix C);
- areas proposed to be recommended to Congress for inclusion in the National Wilderness Preservation System (chapter 3, management area 1b);
- the rivers identified as eligible for inclusion in the National Wild and Scenic Rivers System (chapter 3, management area 2b); and
- the plan monitoring program (chapter 5), including focal species.

Plan components

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

Desired conditions, objectives, standards, guidelines, suitability, and monitoring questions and monitoring indicators have been given alphanumeric identifiers for ease in referencing within the forest plan. The identifiers include

- the level of direction (e.g., FW = forestwide, MA = management area, GA = geographic area; note that with management area or geographic area direction, the management area number and the geographic area acronym are also included);
- the type of direction (DC = desired condition, OBJ = objective, STD = standard, GDL = guideline, SUIT = suitability, MON = monitoring question, IND = monitoring indicator);
- the resource (for forestwide direction) (e.g., WTR = watersheds, TE&V = terrestrial ecosystems and vegetation); and
- a unique number (i.e., in numerical order starting with 01).

Thus, forestwide direction for desired conditions associated with watersheds is identified starting with FW-DC-WTR-01; management area direction for desired conditions in management area 2b is identified starting with MA2b-DC-01, and desired condition for the Hungry Horse geographic area is identified starting with GA-HH-DC-01. The identifiers are included as part of the headings in chapters 2 through 4, with the unique number preceding each plan component.

Following are the definitions and, where necessary, a description of the context of the required plan components (36 § CFR 219.7(e)).

Management, geographic, and designated areas

Every plan must have management areas or geographic areas or both. The plan may identify designated or recommended designated areas as management areas or geographic areas (36 CFR § 219.7(d)). These areas are assigned sets of plan components such as desired conditions, suitable uses, and in some areas either standards or guidelines or both. Geographic area desired conditions describe what the Forest wants to achieve in specific geographic areas that are not necessarily covered by forestwide desired conditions. Although all resources have been considered, the only desired conditions specified for a geographic area are those that are not adequately addressed by forestwide desired conditions.

Designated areas or features are identified and managed to maintain their 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, inventoried roadless areas, 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 (36 CFR § 219.19). Refer to chapter 3, management area direction, for plan components related to the special designations of wilderness (management area 1a), wild and scenic rivers (management area 2a), special areas (management area 3b), and research natural areas (management area 4a). Plan components for the national trails special designations are in chapter 3, forestwide direction.

Desired conditions

A desired condition is a description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, towards which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress towards their achievement to be determined but must not include completion dates (36 CFR § 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, but for other resources they may only be achievable over a long time period.

This plan presents three types of desired conditions, as follows:

- Forestwide desired conditions apply across the landscape but may be applicable to specific areas as designated on a map.
- Management area desired conditions are indications of the future conditions that would typically be desired. They help clarify the general suitability of various parts of the Forest for different activities and management practices. These desired conditions help clarify the outcomes that might be expected in land areas with different general suitability descriptions.
- While all resources have been considered for forestwide direction, plan components have been developed at the geographic areas to further refine plan direction spatially within the respective geographic areas. Geographic area desired conditions are specific to an area or place, such as a river basin or valley, and reflect community values and local conditions within the area. They do not substitute for or repeat forestwide desired conditions. These desired conditions focus on specific circumstances in specific geographic locations. The Forest is divided into six geographic areas (see figure 2 in chapter 4).

Objectives

An objective is a concise, measurable, and time-specific statement of a desired rate of progress towards a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets (36 CFR § 219.7(e)(1)(ii)). Objectives describe the focus of management in the plan 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. Objectives can be forestwide or specific to management areas or geographic areas. Refer also to appendix C, Potential Management Approaches and Possible Actions, for possible strategies to achieve certain objectives.

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 or decreases, increased or decreased planning efficiencies, and unanticipated resource constraints.

Standards

A standard is a mandatory constraint on project and activity decisionmaking that is established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements (36 CFR § 219.7(e)(1)(iii)). Standards can be developed for forestwide application or be specific to a management area or geographic area.

Guidelines

A guideline is a constraint on project and activity decisionmaking 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 CFR § 219.7(e)(1)(iv)). A guideline can be forestwide or specific to a management area or geographic area.

Suitability of lands

Specific lands within the Forest are identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan identifies lands within the Forest as not suitable for uses that are not compatible with desired conditions for those lands. The suitability of lands is not identified for every use or activity, following guidance provided at 36 CFR § 219.7 (e)(1)(v).

The identification of suitability of lands for a particular use in the forest plan indicates that the use may be appropriate but does not make a specific commitment to authorize that use. If certain lands are identified as not suitable for a use, then that use or activity may not be authorized. Prohibiting an existing use or authorizing a new use requires subsequent, site-specific National Environmental Policy Act analysis. Generally, the lands on the Forest are suitable for uses and management activities appropriate for national forests, such as outdoor recreation or timber, unless identified as not suitable. For suitability determinations, refer to chapters 2 and 3.

Other required plan content

In addition to requiring that a plan have components, the 2012 planning rule also requires that a plan have “other required content” (36 CFR § 219.7(f)(1)) addressing priority watersheds, the distinctive roles and contributions of the plan area, a plan monitoring program, and proposed and possible actions. Distinctive roles and contributions are discussed below; the remainder of the required content can be found in chapter 5, Monitoring Program, appendix C, Potential Management Approaches and Possible Actions, and appendix E, Watershed Condition Framework and Conservation Watershed Network.

Summary of the 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 proposed plan, including plan components, the monitoring program, and plan decisions. The foundation from which the plan components were developed for the forest plan was provided by the assessment of the Flathead National Forest¹ and the best available scientific information

¹ USDA (2014), *Assessment of the Flathead National Forest, part 1, part 2, and appendices A-E* (Kalispell, MT: USDA Forest Service, Flathead National Forest), retrieved from <https://www.fs.usda.gov/detailfull/flathead/landmanagement/planning/?cid=fseprd565644&width=full>.

and analyses therein. From this foundation, the interdisciplinary team used the best available scientific information to develop the proposed action (May 2015) and the alternatives and the analysis and comparison of alternatives in the draft environmental impact statement (EIS) (May 2016). Refer to the final EIS and the draft record of decision for a full list of references. This information includes material that was readily available from public sources (libraries, research institutions, scientific journals, and on-line literature). It also includes information obtained from other sources, such as via participation and attendance at scientific conferences; scientific knowledge from local experts; findings from ongoing research projects; workshops and collaborations; professional knowledge and experience; and information received during public participation periods. The interdisciplinary team utilized an updated geographic information system (GIS) database that was originally developed for the 1986 forest plan. The interdisciplinary team used the GIS database to evaluate complex spatial effects resulting from implementation of the alternatives such as recreation opportunity spectrum and effects to wildlife habitat by species. The interdisciplinary team used an optimization model to estimate the long-term flow of timber from the plan area. This model is widely used by private and state land managers. The model is widely accepted as an accurate way of modeling timber harvest schedules.

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 Flathead's assessment and draft EIS as well as any additional information that was used and is included in the reference sections of the final EIS and in the planning record prior to the final record of decision.

Use of models, maps, and data

The Forest relied on a variety of databases (e.g., those from state agencies, Rocky Mountain Research Station, its own internal databases), to inform plan components. Geospatial data and related maps or graphics are not legal documents and are not intended to be used as such. The data and maps are dynamic and can change over time.

Ecological and economic models were used to inform the management direction. Models, maps, and numeric estimates may change over time as new information, technology, and/or on-the-ground inventories become available.

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. The 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 Forest Service Handbook 1909.12 chap. zero code sec. 07.11). See chapter 5 for the monitoring program and additional information about adaptive management.

Relationship to other strategic guidance

The Forest contributes to the accomplishment of national strategic guidance in accordance with its own unique combination of social, economic, and ecologic conditions. This forest plan helps define the Forest's role in advancing the agency's national strategy and reflects the national goals. This forest plan is reflective of the mission of the Forest Service, which is "to sustain the health, diversity, and productivity

of the nation's forests and grasslands to meet the needs of present and future generations." The forest plan also incorporates the direction and goals in other applicable tribal, Federal, State, and county plans and an "all lands" integrated approach that considers the broader landscape that the plan operates within.

Retained direction: Northern Rockies Lynx Management Direction

The Northern Rockies Lynx Management Direction is retained in appendix A. This lynx direction contains goals, objectives, standards, and guidelines. This lynx direction is retained in this forest plan through standard FW-STD-WL-04, with proposed Forest-specific modifications to one guideline and the addition of one exception to a standard (see FW-GDL-REC-03 and FW-STD-TE&V-02).

Rights and interests

The forest plan will provide a strategic framework that guides future management decisions and actions. As such, the plan will not create, authorize, or execute any ground-disturbing activity. The plan will not subject anyone to civil or criminal liability and will create no legal rights. The plan will not change existing permits or authorized uses; to change existing uses, for example, a subsequent decision would be needed (see p. 1).

Distinctive Roles and Contributions of the Flathead National Forest

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

- truly unique attributes of the plan area or unique benefits (uses, values, products, and services) provided by the plan area to the broader landscape;
- attributes that are important and relevant at the local, regional, and/or national level; and
- attributes that contribute towards social, economic, and ecological sustainability.

Ecological resources

The Forest has an inherently high diversity of plant and animal life due to its geographic location, geology, ecologically significant wetlands, topography, elevation ranges, climate conditions, and unique patterns of historical disturbance processes, primarily wildfires of variable severities and sizes. The Forest is uniquely positioned in the heart of the Crown of the Continent Ecosystem, with a complex of wilderness and unroaded areas that border Glacier National Park and a remote portion of British Columbia (see figure 1). This location, one of the largest wild areas in the lower 48 states, enhances its importance as a connector of habitats and core populations of associated wildlife.

The Crown of the Continent Ecosystem harbors one of the most intact assemblages of medium to large carnivores in the contiguous United States and is inhabited by hundreds of species of native mammals, birds, fish, reptiles, amphibians, and invertebrates. Numerous carnivores inhabit the Forest, including the Canada lynx as well as the grizzly bear and wolverine. The Flathead National Forest is part of Canada lynx critical habitat unit 3, which is the Northern Rocky Mountains region defined by the U.S. Fish and Wildlife Service (USFWS). The largest population of grizzly bears and one of the largest populations of

wolverines in the lower 48 states inhabits the Forest and surrounding portions of the Crown of the Continent Ecosystem.²

The Forest is part of the Northern Continental Divide Ecosystem (NCDE) for grizzly bears, one of seven grizzly bear ecosystems in the continental United States. The Flathead River in British Columbia and the North Fork of the Flathead River in Montana, as well as drainages on the east side of the Continental Divide that are located in the northwestern portion of the Crown of the Continent Ecosystem, have the highest density of grizzly bears in inland North America. The Forest is the largest land manager within the NCDE recovery zone, managing approximately 37 percent of NCDE lands. Over 1,000 bears are estimated to be within the NCDE.³

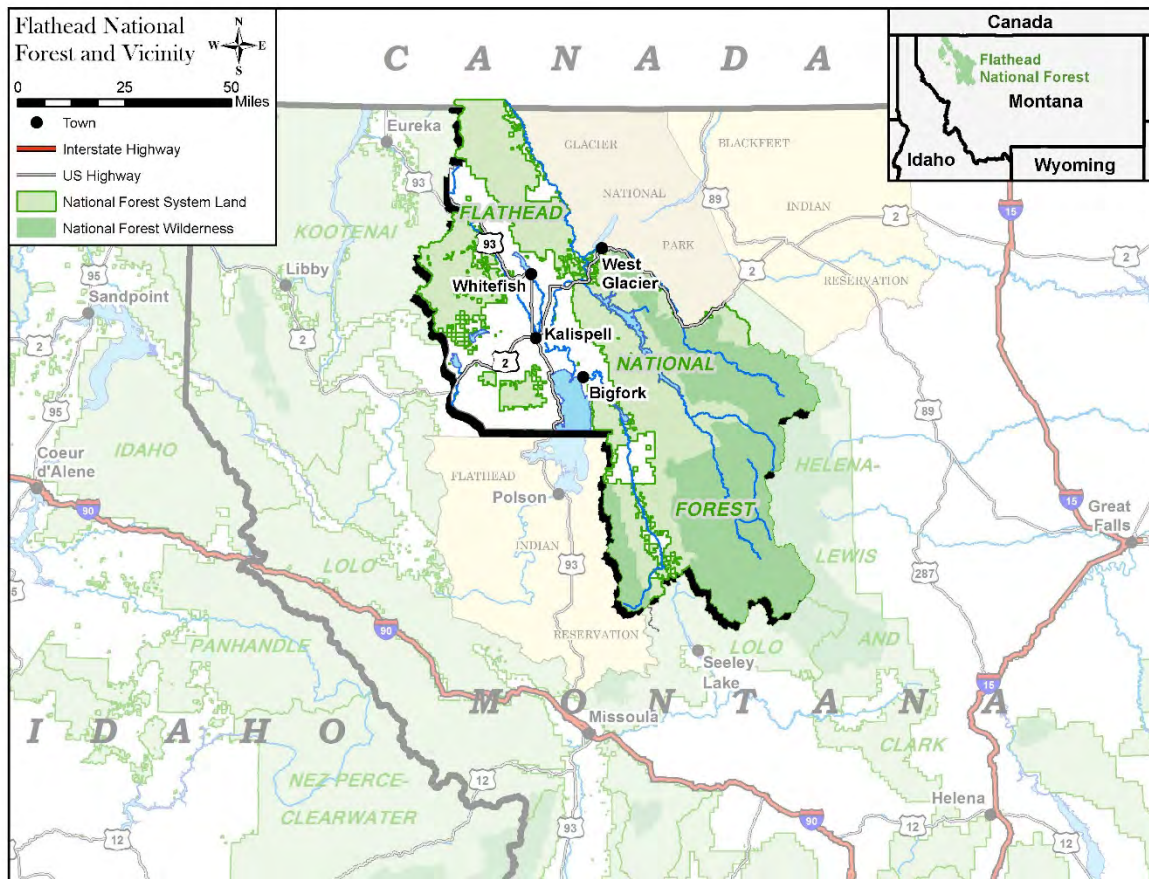


Figure 1. Flathead National Forest and vicinity

² J. L. Weaver (2013), *Safe havens, safe passages for vulnerable fish and wildlife: Critical landscapes in the southern Canadian Rockies, British Columbia and Montana* (Toronto, ON: Wildlife Conservation Society Canada), retrieved from http://static1.1.sqspcdn.com/static/f/808688/22226554/1363718404393/Weaver2013_SCR_WCSweb.pdf?token=u4ebRkBPswd5Ov3yQytOnA4tu00%3D.

³ R. D. Mace, D. W. Carney, T. Chilton-Radandt, S. A. Courville, M. A. Haroldson, R. B. Harris, . . . E. Wenum (2012), Grizzly bear population vital rates and trend in the Northern Continental Divide Ecosystem, Montana, *The Journal of Wildlife Management*, 76(1), 119-128, doi:10.1002/jwmg.250, retrieved from <http://dx.doi.org/10.1002/jwmg.250>.

The Flathead National Forest is noted for abundant aquatic and wetland resources. Its diverse wetlands (including fens, marshlands, glaciated ponds, woodland vernal pools, wet meadows, and sloughs) and associated riparian areas provide high water quality and key habitats for a large variety of wildlife and plant species, including the threatened plant water howellia. In Montana, this plant is found only in the Swan Valley. A large portion of the watersheds for the North and Middle Forks and the South Fork (above Hungry Horse Reservoir) is within protected areas, resulting in abundant intact riparian and wetland habitats.

Bull trout and westslope cutthroat trout migrate as adults from Flathead Lake to natal streams on the Forest to spawn. Thus, Flathead Lake and the Forest are closely connected. Although complex food web dynamics within Flathead Lake have led to declines in the numbers of these native fish, local populations on the Forest have not been lost.

Flathead Lake is the largest (by surface area) natural freshwater lake in the western United States outside of Alaska and the 79th largest natural freshwater lake in the world, and it is also one of the cleanest. It covers 191.5 square miles (495.9 square kilometers) and has a mean depth of 165 feet and a maximum depth of 371 feet. Flathead Lake's high water quality results from the rapid flushing of the lake (all the water is replaced approximately every 2.2 years) and from its watershed being mainly national park, designated wilderness, and managed forest lands (> 60 percent); having a relatively low human population (~ 95,000); being dominated by very old, low-nutrient soils; and receiving high amounts of precipitation (mostly as mountain snow).⁴

Hungry Horse Reservoir is the uppermost dam within the Columbia River system. Construction of the dam in 1953 disconnected the South Fork of the Flathead River system from Flathead Lake for migratory fish, but the dam now serves as a protective barrier to non-native fish. The South Fork of the Flathead River system and Hungry Horse Reservoir support one of the largest intact native fish assemblages in the western United States. The South Fork Westslope Cutthroat Trout Conservation Project was completed in 2017 with the treatment of Sunburst Lake; the only non-native fish population in this watershed is arctic grayling in Handkerchief Lake.

The Flathead National Forest also has six research natural areas that are part of a national network of ecological areas managed for research, education, and maintenance of biological and geological diversity. These research natural areas represent a wide range of forest types as well as a diversity of wetlands, lakes, fens, and habitats for numerous rare plant species.

Social and economic resources

The Forest surrounds Glacier National Park on its western and southern borders. This highly scenic complex of lands draws visitors from around the world. The incredible scenery of the area contributes to community identity and sense of place, quality of life, the tourism industry, and increased real estate values.

The Forest has both developed and dispersed recreation that provide for a broad and diverse range of year-round activities that range from exploring designated wilderness areas to skiing at developed ski resorts. There are two regionally significant ski areas (Whitefish Mountain Resort and Blacktail Mountain Ski Area), motorized and nonmotorized travel and recreation (including mountain biking, hiking,

⁴ Flathead Lake Biological Station (2016), About Flathead Lake, retrieved from <http://flbs.umt.edu/lake/flatheadlake.aspx>.

snowmobiling, and driving for pleasure), hunting, fishing, camping, Nordic skiing, whitewater boating, and other water- and lake-related opportunities.

The Forest provides abundant water for drinking and downstream uses as well as the municipal watershed (Haskill Basin) for the City of Whitefish.

The Jewel Basin hiking area is a unique, approximately 15,315-acre area managed exclusively for hiking and camping, with over 20 high mountain lakes providing fishing opportunities.

The Forest contains over a million acres of designated wilderness, including the Bob Marshall Wilderness, Great Bear Wilderness, and Mission Mountains Wilderness. The Forest has one designated wild and scenic river, the Flathead River, which has three forks—the North Fork, South Fork, and Middle Fork. The Flathead River was designated wild and scenic by Congress in 1976.

Wilderness lands provide hiking, hunting, fishing, boating, and horseback riding at the primitive end of the spectrum. Outfitters and guides play an important role in teaching and connecting people with the outdoors. They provide recreational experiences to visitors such as rafting, horseback riding, hunting, and camping. The Great Bear Wilderness, part of the Bob Marshall Wilderness Complex, has a functioning historic airstrip that provides fly-in recreation opportunities for people arriving in small planes.

Recreating at the primitive end of the spectrum provides the user a very high probability of solitude, closeness to nature, self-reliance, high challenge, and risk, with little evidence of people. Solitude is commonly defined as an escape or complete isolation from all other people or a situation in which you are alone, usually because you want to be. Some components of solitude are remoteness, naturalness, and removal from human intrusions.

Jobs in the recreation sector bring revenue into the local economy, of which 20 percent of the jobs are tied to tourism-related industries. Whitefish Mountain Resort and Blacktail Mountain Ski Area contribute significantly to the local economy by creating jobs and attracting visitors. Many river-based and backcountry outfitters and guides and other recreation-based companies are dependent on the Forest for their livelihood. As the largest land jurisdiction in Flathead County, the Forest serves as the backdrop for residents and plays a key role in supporting the social and economic sustainability of local communities, the state of Montana, and the broader region.

Historically, the Flathead Valley was the center of a forest products industry that created jobs and products and played a dominant role in the local economy. The exploration, settlement, and development of the area for forest and fire management created a network of roads and trails that made recreational access to this mountainous country possible. Although the volume of the timber harvest has declined in recent decades, the industry continues to be important to the local economy and to provide forest products to meet local and national needs. Flathead County and adjoining Lake, Lincoln, and Sanders Counties derive a higher percentage of their employment from timber-related industries than either the state or the nation. The forest products industry contributes to the sense of place in the Flathead Valley.

Wildlife-related activities (hunting, fishing, wildlife viewing) are important to residents of Montana as well as to visitors. Hunting in northwestern Montana (Flathead, Lake, Lincoln, and Sanders Counties) is an important social and economic activity. Although most of the hunting is associated with deer and elk, a large proportion of the moose hunting in the state (around one third) occurs in this four-county area.

The Forest has large quantities of huckleberries (*Vaccinium* spp.). This forest product is a key ecosystem characteristic in northwestern Montana because the huckleberry fruit is highly sought after by both humans and wildlife. Large quantities of the berries are collected in the wild and sold both locally and

nationally, fresh and in products such as jams. Huckleberries remain an important food source for Native Americans.

Cultural resources

Cultural features are evident across the Forest, including log cabins and remnants of early Euro-American settlements, Forest Service ranger stations and fire lookouts, and Native American travel routes and cultural sites, including habitation areas, collecting areas, and places of traditional importance. The Great Northern Railway reached the Flathead Valley in 1891. With the coming of the railroad, lumber became an even more important product of the Flathead Valley. Many mills opened throughout the valley, and numerous small operators set up mills on Forest lands. Evidence of this historic harvesting and milling still exists as heritage sites managed by the Forest. Many of the structures, trails, and sites have retained their historic integrity and add to the area's character and sense of place.

Five historic properties—Hornet Lookout, the Flathead National Forest Backcountry Administrative Facilities Historic District, the South Fork Phone Line, the Wurtz Homestead, and the Big Creek Ranger Station Historic District—are listed in the National Register of Historic Places. The Forest has approximately 350 recorded cultural resources, and there are potentially additional sites that have not yet been identified. Of the known sites, approximately 275 are historic-period sites associated with the Flathead National Forest Backcountry Administrative Facilities Historic District (ranger district headquarters, guard stations, and the trails and communications systems that connect them), early 20th-century Euro-American farming and mining sites, and historic logging sites. Approximately 31 of these sites, including five artifact and photograph collections, are listed as priority heritage assets and managed appropriately as such. Another 35 sites have been determined as eligible for listing in the National Register of Historic Places; the eligibility status of the remaining known sites is undetermined.

The plan area is the traditional homeland of the Kootenai and Salish peoples and, to a lesser extent, the Blackfeet people. The Confederated Salish and Kootenai Tribes of Montana, which includes the Kootenai, the Bitterroot Salish, and the Pend d'Oreille peoples, have reserved treaty rights in the plan area under the Hellgate Treaty of 1855. These treaty rights include hunting, gathering, and grazing rights on Federal lands within the plan area. The Flathead Indian Reservation, which is home to the Confederated Salish and Kootenai Tribes, shares a border with the Forest along the Forest's southwestern boundary.

Approximately 75 of the known archaeological sites on the Forest are associated with Native American uses of the land. These include lithic scatters, travel routes, Indian scarred trees, and rock art. There are traditional travel routes and camp locations along the North Fork of the Flathead River, as well as burial and rock art sites. There is also a significant Native American trail network in the South Fork of the Flathead area that has been determined eligible for listing in the National Register of Historic Places.

Chapter 2. Forestwide Direction

This chapter contains management direction that applies forestwide unless more stringent or restrictive direction is found in chapter 3 or chapter 4. Forestwide direction includes desired conditions, objectives, standards, guidelines, and suitability. Other Forest Service direction, laws, regulations, policies, executive orders, and Forest Service directives (in the Forest Service Manual and the Forest Service Handbook) are generally not contained in the forest plan components.

This chapter is organized by resource under the following broad categories:

1. Physical and Biological Elements
2. Human Uses, Benefits, and Designations of the Forest
3. Production of Natural Resources
4. Economic and Social Environment

The Forest intends to move towards these forestwide desired conditions over the next 10 to 15 years. Some desired conditions may be very difficult to achieve in this time frame, but it is important to move towards them over time.

Physical and Biological Elements

Aquatic Ecosystems

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, wetlands, and water quality. 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 for implementation of plan components.

Lands within the Forest supply high-quality water that supports a variety of uses throughout the Flathead River Basin. Aquatic ecosystems, watersheds, and wetlands have changed from historic conditions. Current conditions and trends indicate the following:

- A decline in migratory bull trout numbers has occurred during the past several decades, primarily due to changes in climate and lake trout competition and predation in Flathead, Whitefish, Swan, Lindbergh, and Holland Lakes. However, bull trout populations remain strong in the Hungry Horse and South Fork geographic areas due to the absence of lake trout.
- Major threats to bull trout and westslope cutthroat trout include the presence and expansion of non-native species (lake trout, rainbow trout, and brook trout) and climate change. Westslope cutthroat trout populations remain strong in the three forks of the Flathead River, particularly the South Fork, but have declined in the Swan and Stillwater River systems.
- A small percentage of inventoried road culverts are confirmed to be partial barriers or total barriers to westslope cutthroat trout during some part of the year. In some cases, these barriers may be beneficial for retention of native fish populations by excluding non-native fish, but in many cases these barriers are disrupting the natural migration patterns of native fish.

- The watershed condition framework assessment of the Forest,⁵ which was completed in 2011 and updated in 2015, determined that 97 percent of the watersheds on the Forest are in Class 1 condition (functioning appropriately). There are five Class 2 (functioning at risk) watersheds (see figure B-01), which is less than 3 percent of all watersheds on the Forest.
- Montana Department of Environmental Quality determined that sediment continues to impair aquatic life in the following creeks on the Forest: Logan, Sheppard, Coal, Goat, and Jim Creeks. The agency completed sediment total maximum daily loads (TMDLs) for those waterbody segments. Therefore, TMDLs have been developed for all streams on the Forest where required. Four waterbodies that are below the Forest's boundary—Whitefish Lake (2004), Swan Lake (2004), Haskill Creek (2014), and the Stillwater River (2014)—also have sediment TMDLs. During the last several years, the Forest has been working to restore soil, watershed, and aquatic habitat conditions by implementing best management practices, removing roads not needed for management or access by other landowners, improving road conditions (reducing sediment), removing man-made fish migration barriers, and implementing riparian conservation strategies and threatened and endangered species conservation strategies. Much of this work has been accomplished as part of TMDL implementation plans in cooperation with the State of Montana and the Environmental Protection Agency. Big Creek was the very first impaired waterbody in the State to be removed from the list for sediment because of restored function, but it remains listed for habitat alteration. Lastly, sediment TMDL has been completed for Sheppard and Logan creeks in the Salish geographic area.

The Forest is known for its highly diverse wetlands, including marshes, swamps, wet meadows, fens, peatlands, glaciated ponds, wooded vernal pools, and riparian areas. Diverse plant and animal species are associated with these and other unique habitats. Water howellia, a threatened plant, is found in Montana only in the Swan Valley. For additional information about conditions and trends, refer to the Forest assessment.⁶

Watersheds

This section provides forestwide direction for overall watershed health. The following desired conditions apply at the larger (e.g., watershed) scale (10- or 12-digit hydrologic unit scale), not at particular sites such as stream reaches. The national hydrologic unit is the basis for defining the specific scales at which the watershed desired conditions apply. The three watershed scales most relevant to the implementation of the forest plan are subbasin (8-digit hydrologic unit), watershed (10-digit hydrologic unit), and subwatershed (12-digit hydrologic unit). Individual project assessments often use data collected at finer scales, such as the subwatershed, drainage, valley segment, site, or stream reach scale. Appendix C contains a more detailed description of the scales at which these desired conditions generally apply to forest planning and project planning.

Desired conditions (FW-DC-WTR)

- 01** NFS lands provide the distribution, diversity, and complexity of watershed- and landscape-scale features, including natural disturbance regimes and the aquatic and riparian ecosystems, to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic

⁵ USDA (2015), *Watershed condition classification rankings: Flathead National Forest (updated from 2011)* (USDA Forest Service, Flathead National Forest), planning record exhibit # 00333.

⁶ USDA (2014), *Assessment of the Flathead National Forest, part 1, part 2, and appendices A-E* (Kalispell, MT: USDA Forest Service, Flathead National Forest), retrieved from <https://www.fs.usda.gov/detailfull/flathead/landmanagement/planning/?cid=fseprd565644&width=full>.

ecosystems retain their inherent resilience and are able to respond and adjust to disturbances without long-term adverse changes to their 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, riparian-associated, and many upland species of plants and animals.
- 03** Habitat and ecological conditions support self-sustaining populations of native aquatic and riparian-associated plant and animal species.
- 04** 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 the range of conditions of the reference watersheds as defined by agency monitoring. Refer to FW-DC-WTR-07 and FW-DC-RMZ-01.
- 05** Aquatic systems and riparian habitats possess physical integrity, including physical integrity of shorelines, banks, and bottom configurations, within their natural range of variation.
- 06** Water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and meets the ecological needs of native aquatic and riparian-associated plant and animal species. 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 (e.g., TMDLs) or are permanently above natural or background levels.
- 07** The sediment regime within waterbodies 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. Refer to FW-DC-WTR-04 and FW-DC-RMZ-01.
- 08** 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, duration, and spatial distribution of peak, high, and low flows are retained. Streamflow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. Stream channels transport sediment and woody material over time while maintaining reference dimensions (e.g., bankfull width, depth, entrenchment ratio, slope, and sinuosity).
- 09** 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.
- 10** Groundwater-dependent ecosystems, including peatlands, bogs, fens, wetlands, seeps, springs, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size and seasonal and annual timing and exhibit water table elevations within the natural range of variation. Surface and groundwater flows are connected, provide late-season stream flows and cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems.
- 11** 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. Non-forested areas in and surrounding wetlands are composed of plant and animal communities that support and contribute to wetland ecological and habitat diversity.

- 12 Habitats and native assemblages of aquatic and riparian-associated plants and animals are free of persistent non-native species such as zebra mussels, New Zealand mud snails, quagga mussels, Eurasian milfoil, and brown trout. Non-native species (e.g., non-native bullfrogs, Chytrid fungus, yellow flag iris, or reed canary grass) are not expanding into waterbodies.
- 13 Peatlands, including fens, have the necessary soil, hydrologic, water chemistry, and vegetative conditions to provide for continued fen development and resilience to changes in climate and other stressors. Peatlands support unique plant and animal species that are characteristic of historical conditions. Trees exist on drier hummocks within and on the edge of peatlands but do not retard development.
- 14 Beavers play an important ecological role benefiting groundwater, surface water, stream aquatic habitat complexity, and adaptation to changing climate conditions.
- 15 Watersheds provide high-quality water for downstream communities dependent upon them.
- 16 Educational and informational programs are provided to enhance understanding of wetlands, stream ecosystems, and watersheds.
- 17 The Forest cooperates with Federal, tribal, State, and local governments to identify and secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.

Objectives (FW-OBJ-WTR)

- 01 Complete all essential work identified within the Class 2 priority watersheds as identified under the watershed condition framework (see appendix E).
- 02 Enhance or restore 25 to 50 miles of stream habitat to maintain or restore structure, composition, and function of habitat for fisheries and aquatic species other than fish. Activities include, but are not limited to, barrier removal, large woody debris placement, road decommissioning or stormproofing, riparian planting, and channel reconstruction.
- 03 Reconnect 10 to 20 miles of habitat in streams disconnected by roads or culverts where aquatic and riparian-associated species' migratory needs are limiting distribution of those species.
- 04 Improve watershed conditions on 4,000 to 8,000 acres, with an emphasis on priority watersheds under the watershed condition framework and the conservation watershed network.

Standards (FW-STD-WTR)

- 01 New stream diversions and associated ditches shall have screens placed on them to prevent capture of fish and other aquatic organisms.
- 02 Project-specific best management practices (including both Federal and State of Montana practices) shall be incorporated into project plans as a principle mechanism for controlling non-point pollution sources in order 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.

Guidelines (FW-GDL-WTR)

- 01** In order to restore watersheds, sediment-producing activities in watersheds with approved TMDLs should be designed to comply with the Montana Department of Environmental Quality's TMDL implementation plan.
- 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 or human safety, such as mid-channel bridge piers, or poses long-term risks to bull trout passage.
- 03** When drafting water from streams, pumps should be screened to prevent capture of fish and aquatic organisms. During the spawning season for native fish, pumping sites should be located away from spawning gravels.
- 04** When beaver dams are threatening infrastructure or impairing bull trout spawning, preferred techniques that sustain beavers (e.g., using pipes to reduce water levels, notching dams to restore fish passage) should be used.
- 05** To protect spawning fish, eggs, and embryos, in-stream management activities that may disturb native salmonids or that have the potential to directly deliver sediment to their habitats should be limited to times outside of spawning and incubation seasons for those species, as displayed in table 1.

Table 1. Operational restrictions to protect spawning fish and fry emergence while operating within the high water mark

Species	Location	Inoperable activity period
Westslope cutthroat trout	Known spawning streams	May 1 through July 15
Bull trout	Known spawning streams	September 1 through March 15

- 06** Information on preventive measures related to aquatic invasive species should be provided at water-based recreation sites such as boat ramps to help prevent the introduction of non-native species.
- 07** To prevent the introduction of non-native species, equipment that comes in contact with a waterbody should be inspected and cleaned of aquatic invasive species prior to use in a waterbody or when moving between watersheds, including drafting equipment, water tenders, and helicopter buckets.
- 08** When aquatic invasive species (e.g., zebra mussels, quagga mussels, Eurasian milfoil, reed canary grass) are detected, they should be controlled in cooperation with appropriate agencies.
- 09** New management activities shall be consistent with applicable state source water protection requirements and goals. Short-term effects⁷ from activities may be acceptable when those activities support long-term benefits⁸ to aquatic resources.

Conservation Watershed Network

The conservation watershed network is a specific subset of watersheds (10- or 12-digit hydrologic unit codes) in which the long-term conservation and preservation of bull trout and pure westslope cutthroat

⁷ Effects that occur during, or immediately following, implementation of activity.

⁸ Benefits that occur following completion of the activity.

trout is prioritized, specifically in areas with an absence of non-native competition (see figure B-02). The conservation watershed network also provides protection for wildlife.

Desired conditions (FW-DC-CWN)

- 01 The conservation watershed network has high-quality habitat and functionally intact ecosystems that are contributing to and enhancing the conservation and recovery of specific threatened or endangered fish species or aquatic species of conservation concern⁹ and providing high water quality and quantity. The watersheds contribute to the conservation and recovery of native fish and other aquatic species and help make habitat conditions more resilient to climate change.

Objectives (FW-OBJ-CWN)

- 01 The conservation watershed network is the highest priority for restoration actions for native fish and other aquatic species. The stormproofing of 15 to 30 percent of the roads in the conservation watershed network is prioritized, as funding allows, to benefit aquatic species (e.g., bull trout). See appendix C for specific strategies for treatment options and for prioritization, such as of roads paralleling streams vs. ridgetop roads.
- 02 Over the life of the plan, stormproofing the transportation system (e.g., upsizing culverts, reducing sediment on roads, realigning stream-constraining road segments, etc.) will be accomplished as opportunities are identified on the following prioritized subwatersheds: Sullivan Creek, Wounded Buck Creek, Trail Creek in the North Fork, Whale Creek (includes Upper Whale, Lower Whale, and Shorty Creeks), Granite Creek, Bear Creek, Goat Creek, and Lion Creek.

Guidelines (FW-GDL-CWN)

- 01 To reduce sedimentation, for subwatersheds included in the conservation watershed network, net increases in stream crossings and road lengths should be avoided in riparian management zones unless the net increase improves ecological function in aquatic ecosystems. The net increase is measured from the beginning to the end of each project.

Riparian Management Zones

Riparian management zones are areas adjacent to perennial and intermittent streams, wetlands, ponds, lakes, and reservoirs, as defined by standard FW-STD-RMZ-01. The functions of riparian management zones within aquatic ecosystems include (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading streams, and (4) protecting water quality.¹⁰ A critical function of riparian management zones is to contribute to wildlife habitat use and connectivity. As the interface between aquatic and terrestrial ecosystems, riparian areas provide unique habitat characteristics.

Desired conditions (FW-DC-RMZ)

- 01 Riparian management zones reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance

⁹ Species of conservation concern are identified by the Regional Forester; more information is available at <http://bit.ly/NorthernRegion-SCC>.

¹⁰ R. J. Naiman, T. J. Beechie, L. E. Benda, D. R. Berg, P. A. Bison, L. H. MacDonald, . . . E. A. Steel (1992), Fundamental elements of ecologically healthy watersheds in the Pacific Northwest coastal ecoregion, in R. J. Naiman (Ed.), *Watershed management: Balancing sustainability with environmental change* (pp. 127-188), New York, NY: Springer-Verlag.

regimes and processes affecting the area. In addition to natural processes, vegetation management activities contribute to vegetation conditions that are resilient. The species composition and structural diversity of native plant communities in riparian management zones, including wetlands, provide summer and winter thermal regulation, nutrient filtering and appropriate rates of surface erosion, bank erosion, and channel migration. Refer to FW-DC-WTR-04 and 07.

- 02** Riparian management zones provide key conditions, including slope stability and associated vegetative root strength, wood delivery to streams and streambanks, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality, operating consistently with local disturbance regimes.
- 03** Riparian management zones in forested settings have more diverse vegetation structure relative to areas outside the riparian management zone. This includes a higher density of large downed wood, snags, and decadent live trees and higher amounts of litter and duff to support terrestrial riparian-associated plants and animals that feed, nest, den, or roost near water. Downed wood greater than 9 inches in diameter is available, consisting of intact pieces of a variety of species, sizes, and stages of decay, including cull tree tops and cull logs.
- 04** Riparian management zones have more diverse vegetation composition relative to areas outside the riparian management zone. This includes riparian-associated grasses, forbs, shrubs (e.g., willows); deciduous trees (e.g., cottonwoods, birch, aspen), and conifer trees to support terrestrial animals that feed, nest, den, or roost near water.
- 05** A mosaic vegetation pattern, including forest patches of different shapes, successional stages, and tree densities, occurs within riparian management zones. Early successional forest openings are typically irregularly shaped, with variable tree densities or patches of larger trees along their boundaries that reduce the risk of windthrow and reduce edge effects for wildlife.
- 06** Cover conditions in riparian management zones contribute to habitat connectivity for a variety of wildlife species (e.g., Canada lynx, grizzly bear, marten, and fisher).

Objectives (FW-OBJ-RMZ)

- 01** Improve 300 to 1,000 acres of riparian habitat.

Standards (FW-STD-RMZ)

- 01** The entire width of the riparian management zones shall be delineated as follows.

Category 1 Fish-bearing streams: Riparian management zones consist of the stream and the area on both sides of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees,¹¹ or 300 feet slope distance (600 feet total, which includes both sides of the stream channel), whichever is greatest.

Category 2 Permanently flowing non-fish-bearing streams: Riparian management zones consist of the stream and the area on both sides of the stream extending from the edges of the active channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of the riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet

¹¹ The height of a site-potential tree is the expected average maximum height a tree in the dominant crown class (upper forest canopy layer) would achieve, given the site productivity.

slope distance (300 feet total, which includes both sides of the stream channel), whichever is greatest.

Category 3 Seasonally flowing or intermittent streams and lands identified as potentially unstable or landslide prone: This category includes features with high variability in size and site-specific characteristics. At a minimum, the riparian management zone must include (1) the intermittent stream channel and the area to the top of the inner gorge; (2) the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation; (3) the area from the edges of the stream channel, wetland, or landslide-prone terrain to a distance equal to the height of one site-potential tree or 100 feet slope distance (200 feet total, which includes both sides of the stream channel), whichever is greatest; or (4) the extent of unstable and potentially unstable areas (including earthflows).

Category 4a Ponds, lakes, reservoirs, and wetlands greater than 0.5 acre and all sizes of howellia ponds and fens/peatlands: Riparian management zones consist of the body of water or wetland and the area to the outer edges of the riparian vegetation; or to the extent of the seasonally saturated soil; or to the distance of the height of one site-potential tree; or 300 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake—whichever is greatest. For management direction related to water howellia, refer to the following plan components: FW-DC-PLANT-01 and 02, FW-GDL-PLANT-01, 02, and 03, FW-DC-NNIP-01, MA3b-Special Area-DC-04, and GA-SV-DC-01 and 02.

Category 4b Ponds, lakes, reservoirs, and wetlands less than 0.5 acre (except howellia ponds and fens/peatlands; see category 4a): Riparian management zones consist of the body of water or wetland and the area to the outer edges of the riparian vegetation; or to the extent of the seasonally saturated soil; or to the distance of the height of one site-potential tree; or 100 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake—whichever is greatest.

The riparian management zone is divided into two areas called the inner and outer riparian management zones. Management direction may differ in these two zones.

The *inner* riparian management zones are defined as follows:

- ◆ For category 1 and 2 streams, the width of the inner riparian management zone shall be a minimum of 150 feet on each side of the stream.
- ◆ For category 3 streams where side slopes are greater than 35 percent, the width of the inner riparian management zone shall be a minimum of 100 feet on each side of the stream or to the top of the inner gorge slope break, whichever is greater. Exceptions are allowed if the slope within the 100 foot riparian management zone decreases to 15% or less for a distance of at least 30 feet (forming a bench). The boundary of the inner riparian management zone may then be located at the toe of the bench. However, under no circumstance shall the inner riparian management zone be less than 50 feet on each side of the stream. See appendix C for a diagram illustrating this exception.
- ◆ For category 3 streams where side slopes are less than 35 percent, the inner riparian management zone shall be a minimum of 50 feet on each side of the stream.
- ◆ For category 4a and 4b ponds, lakes, reservoirs, and wetlands, the width of the inner riparian management zone shall be a minimum of 50 feet except for peatlands, fens, and bogs, where the minimum width is 300 feet.

In all categories the width of the inner riparian management zone in the descriptions above can be increased to protect sensitive resources. If an already established road is located within the riparian management zone, a site-specific determination shall be made as to the width of the inner riparian management zone. The portion of the riparian management zone that lies below the road may become the inner riparian management zone, and the portion above the road would become the outer riparian management zone.

The following standards apply to the entire riparian management zones for all categories:

- 02** Vegetation management activities within riparian management zones must be consistent with State law (e.g., Montana Streamside Management Zone Law).
- 03** Storage and refueling sites within riparian management zones must be approved by a Forest aquatics specialist or resource advisor and have an approved spill containment plan.
- 04** Herbicides, pesticides, and other chemicals shall not be applied within riparian management zones. Exceptions may be made if chemical use is necessary to maintain, protect, or enhance aquatic and riparian resources or to restore native plant or animal communities.

The following standard applies to the entire riparian management zone for peatlands, fens, and bogs within category 4a:

- 05** Ground-disturbing vegetation treatments in the riparian management zones for peatlands, fens, and bogs shall only occur in order to restore or enhance aquatic and riparian-associated resources.

The following standard applies to the inner riparian management zone for all categories except peatlands, fens, and bogs within category 4a:

- 06** Vegetation management shall only occur in the *inner* riparian management zone in order to restore or enhance aquatic and riparian-associated resources. Exceptions may occur as long as aquatic and riparian-associated resources are maintained. Exceptions shall be limited to (1) non-mechanical treatments such as prescribed fire, sapling thinning, or hand fuel reduction treatments; (2) mechanical fuel reduction treatments in the wildland-urban interface within 300 feet of private property boundaries; or (3) treatments that address human safety hazards (e.g., hazard trees) adjacent to infrastructure or within administrative or developed recreation sites.

Guidelines (FW-GDL-RMZ)

The following guidelines apply to entire riparian management zones for all categories:

- 01** Downed trees (e.g., windthrow) should be left on-site inside of riparian management zones to meet large wood desired conditions, where it is safe and practical to do so.
- 02** Aerial application of chemical retardant, foam, or other fire chemicals and petroleum should not occur in mapped aerial retardant avoidance areas (see glossary) in order to protect terrestrial and aquatic resources associated with riparian management zones.
- 03** Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, and retardant batch plants) for incident activities should not be located in riparian management zones in order to protect terrestrial and aquatic resources associated with riparian management zones.
- 04** To protect the integrity of aquatic and riparian ecosystems, refueling, equipment maintenance, and storage of fuels or other toxicants should not occur in riparian management zones.

- 05 When conducting wildland fire operations within riparian management zones, minimum impact suppression tactics should be used to protect terrestrial and aquatic resources associated with riparian management zones.
- 06 Sand and gravel mining and extraction at new sites should not occur within riparian management zones to protect terrestrial and aquatic resources associated with riparian management zones. Exceptions may occur for trail work.
- 07 At developed recreation sites and administrative sites, trees within the riparian management zone that are determined to be a hazard should be felled to provide for public safety, in consultation with a Forest aquatics specialist. If felled, downed trees should be left on-site as needed to meet large wood desired conditions, where it is safe and practical to do so.
- 08 If tree harvest activities occur within riparian management zones, live reserve trees should be retained (if present) to protect water quality and contribute to forest live tree structural diversity (and future dead standing and downed wood) for aquatic- and riparian-dependent species. Because site and forest conditions vary considerably, the sizes, species, density, and pattern of reserve trees would be determined at the project level.
- 09 If new openings are created in riparian management zones through even-aged regeneration harvest (see glossary) or fuel reduction activities, each created opening's distance to cover (see glossary) should not exceed 350 feet to provide wildlife habitat structural diversity, connectivity, and cover.
- 10 If harvest activities occur within riparian management zones, all snags greater than or equal to 12 inches d.b.h. should be retained within the harvest area to contribute towards more diverse forest structure and desired habitat conditions by providing higher snag and downed wood densities (once the snags fall) as compared to areas outside riparian management zones. Exceptions to this guideline and development of an alternative snag prescription may be considered where there are issues of human health and safety (i.e., developed recreation sites, sites adjacent to landings) or where a decreased amount of wildland fuels is desired to protect communities and community assets (i.e., within the wildland-urban interface). Due to the high density and variability in snags and landscape conditions created by wildfire, exceptions and alternative prescriptions may also be considered in areas burned by stand-replacing fire based on a site-specific analysis.
- 11 To reduce the risk of sediment input and to protect the integrity of aquatic and riparian ecosystems, new roads (including temporary roads) and new landings should not be constructed in category 1, 2 or 3 riparian management zones, except where it is necessary for a road to cross a stream. Exceptions may be considered where site-specific analysis and implementation of mitigation measures are determined appropriate by a Forest aquatics specialist to protect aquatic and riparian resources.

The following guidelines apply to the entire riparian management zone for category 1, 2, and 3 streams and for fens/peatlands:

- 12 Vegetation management activities should be designed to avoid ground disturbance that may deliver sediment and to reduce the risk of alteration of hydrologic processes. Exceptions may be considered where site-specific analysis and implementation of mitigation measures are determined appropriate by a Forest aquatics specialist to protect aquatic and riparian resources.
- 13 If prescribed fire activities occur, ignition should take place outside the riparian management zone and fire should be allowed to naturally spread into the riparian management zones. The intent is to

allow fire to enter and cross the zone at predominantly low to moderate intensity and create vegetation conditions consistent with natural fire regimes.

The following guidelines apply only to the inner riparian management zone for categories 4a and 4b (except fens/peatlands):

- 14** To reduce the risk of sediment input and to protect the integrity of aquatic and riparian ecosystems, new landings and new roads (including temporary roads) should not be constructed. Exceptions for temporary roads and landings may be considered only where site-specific analysis and implementation of mitigation measures are determined to be appropriate by a Forest aquatic specialist to protect aquatic and riparian resources.
- 15** If vegetation treatments occur in the inner riparian management zones, they should be designed to avoid ground disturbance that may deliver sediment and to reduce the risk of alteration of hydrologic processes. Exceptions may be considered where site-specific analysis and implementation of mitigation measures are determined appropriate by a Forest aquatic specialist to protect aquatic and riparian resources.

Suitability (FW-SUIT-RMZ)

- 01** Riparian management zones are not suitable for timber production. Timber harvesting for other multiple-use purposes is allowable.

Soils and Geology

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 and guidelines. The emphasis of soil management includes protection of long-term soil quality and ecological function. 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.

Desired conditions (FW-DC-SOIL)

- 01** Soil function and long-term productivity is conserved.

Standards (FW-STD-SOIL)

- 01** Vegetation management activities do 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 condition and proposed activity must not exceed 15 percent following project implementation and restoration. In areas where more than 15 percent detrimental soil conditions exist from prior activities, the effects from project implementation and restoration must address currently impaired soil functions to improve the long-term soil condition.
- 02** Project-specific best management practices and design features shall be incorporated into land management activities as a principle mechanism for protecting soil resources.
- 03** Soil function shall be restored on temporary roads (and decommissioned road prisms used as temporary roads) when management activities that use these roads are completed. Restoration treatments shall be based on site characteristics and methods that have been demonstrated to measurably improve soil productivity.

- 04 When decommissioning existing roads, soil function shall be restored. Restoration treatments shall be based on site characteristics and methods that have been demonstrated to measurably improve soil productivity.

Guidelines (FW-GDL-SOIL)

- 01 Ground-based equipment for vegetation management should only operate on slopes less than 40 percent to protect soil quality. Exceptions will be considered only with site-specific analysis 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 landslide-prone areas.
- 03 Project activities should provide sufficient effective ground cover with a post-implementation target of 85 percent to provide nutrients and reduce soil erosion.
- 04 To maintain organic matter for soil function, vegetation management activities should conserve coarse woody debris at levels described in FW-DC-TE&V-17 and FW-GDL-TE&V-08 in the Vegetation and Terrestrial Ecosystems section. Management activities should either retain forest floor at half the current thickness or no less than 1 centimeter thick on average across activity areas.

Caves and karst features (CAVES)

There are a large number of caves and related geologic features on Forest lands. Caving and rock-climbing are popular recreational activities in some areas. Cave resources are both fragile and non-renewable and special considerations are required to provide resource protection and recreational opportunities. On federal lands the Federal Cave Resources Protection Act of 1988 (102 Stat. 4546; 16 U.S.C. § 4301-4309) provides for the protection and preservation of caves.

Desired conditions (FW-DC-CAVES)

- 01 The cultural, archaeological, geological, hydrological, paleontological, biological, and aesthetic resources associated with caves and karst features are maintained.
- 02 Cave formations and karst landscapes continue to develop or erode under natural conditions.
- 03 Caves and karst features provide habitat for species, particularly bats, that require specialized niches for raising young, roosting, and overwintering. Disease is not spread by human activities.
- 04 The significant features of caves designated under the Federal Cave Resources Protection Act are protected and maintained.
- 05 Recreational use or scientific studies in caves/karst features protect and maintain cave-dependent species and paleontological and archaeological resources.
- 06 Educational/informational materials are available to cavers on topics such as reducing impacts of human disturbance on species, ecological conditions associated with caves, and measures cavers can use to prevent the spread of diseases such as white-nose syndrome from cave to cave.

Guidelines (FW-GDL-CAVES)

- 01 To protect cave resources, significant caves, identified as such under the Federal Cave Resources Protection Act, should not be signed, disclosed on maps, mentioned in brochures, or have monument markers.

- 02 To protect cave resources such as airflow to caves, closure devices should provide for airflow exchange.
- 03 In order to prevent loss of bat habitat, if caves being used as roosts or hibernacula by bats are closed, for example, to reduce safety hazards or vandalism, bat-friendly closures should be installed unless alternative entries for bats are known to be available.

Terrestrial Ecosystems and Vegetation

Introduction

The Forest has a wide diversity of plant communities across sites that range from warm and moist to dry valley bottoms to cold, steep, non-forested ecosystems, all of which support a rich and diverse assortment of animals. The desired conditions for vegetation describe what is necessary to maintain ecosystem integrity and also contribute to social and economic sustainability, as required by the 2012 planning rule. Analysis of the natural range of variation is the foundation for developing desired conditions, along with integration of additional factors that may be desired such as wildlife habitat needs, existing or anticipated human use patterns, potential future climate conditions, resiliency to future disturbances, and ecosystem services (such as reduction of fire hazard or production of forest products).

Desired conditions reflect the dynamic nature of vegetation conditions over time and space. The collective influence of vegetation changes brought about by climate, ecosystem processes, and management activities achieves the desired conditions. Fluctuations in vegetation conditions over time are expected, with changes occurring both rapidly (such as with fire events) or slowly and gradually (such as with succession). Thus, desired conditions should be viewed and interpreted from both a short-term (i.e., the “life of the plan,” which is 15 years) and a long-term perspective. Vegetation conditions would be considered acceptable if they occur anywhere within (or trend towards) the desired range, though other ecological, social, or economic factors may influence the desired trend or position within the desired range for a particular vegetation characteristic. Standards and guidelines are designed to ensure that certain project activities are conducted in a manner that maintains or moves the Forest towards desired conditions. Monitoring assists in evaluation of vegetation change over time and supports an adaptive management approach to forest management (36 CFR § 219.12). See the detailed monitoring plan in chapter 5.

Lands across the Forest have been grouped into broad potential vegetation types, consistent with the groupings established for the Forest Service in the USDA Forest Service Northern Region.¹² Hereafter in this plan, the broad potential vegetation types are referred to simply as “potential vegetation type” or, in some cases, as simply “type” (as in “warm-moist type”). In tables, the phrase potential vegetation type is abbreviated as “PVT.” Four potential vegetation types for forested lands occur on the Forest: warm-dry type, warm-moist type, cool-moist type, and cold type. Some of the plan components for vegetation apply to these potential vegetation types. Refer to appendix D for additional information, including the individual habitat types that are grouped into each potential vegetation type. Refer to maps in appendix B, both forestwide (figure B-03) and by geographic area (figures B-04 to B-09). The maps display the potential vegetation types for use at a broad-scale level of analysis. Site-specific verification of the

¹² A. Milburn, B. Bollenbacher, M. Manning, & R. Bush (2015), *Region 1 existing and potential vegetation groupings used for broad-level analysis and monitoring*, Missoula, MT: USDA Forest Service, Northern Region, retrieved from <https://www.fs.usda.gov/detailfull/r1/landmanagement/gis/?cid=stelprdb5331054&width=full>, http://fsweb.r1.fs.fed.us/forest/inv/r1_tools/R1_allVeg_Groups.pdf.

potential vegetation type would occur during project-level analysis for purposes of applying forest plan direction.

Additional information helpful in understanding some of the vegetation plan components is provided in appendix C as well as descriptions of potential management approaches and actions that may be used to help achieve desired vegetation conditions. Also, refer to the glossary for definitions and information on the terminology used in these sections.

Desired conditions (FW-DC-TE&V)

General vegetation (FW-DC-TE&V)

- 01** Within the NCDE primary conservation area, the amount, type, and distribution of vegetation provides for the ecological, social, and economic sustainability of NFS lands while also providing habitat components that contribute to sustaining the recovery of the grizzly bear population in the NCDE. See also FW-DC-WL-02.
- 02** Within the NCDE primary conservation area, there is a mosaic of successional stages to provide for grizzly bear habitat needs over the long term.
- 03** Across the landscape, diverse vegetation conditions occur in a complex pattern of species, tree sizes, tree ages, forest densities, patch sizes, canopy layers, and other forest structural characteristics such as downed wood and snags. The vegetation mosaic across the plan area varies greatly over time as vegetation is influenced by site conditions and responds to climate changes, ecological processes (such as natural succession, fire, insects, and disease), and human influences (such as vegetation management). Vegetation conditions and patterns contribute to resistant (the capacity to remain relatively unchanged following disturbances) and/or resilient (the capacity to regain normal functioning following disturbances) forest conditions at both the stand and landscape level.
- 04** Desired habitat conditions across the Forest and within each potential vegetation type contribute to long-term persistence and diversity of native plant and animal species. Ecosystem conditions and ecological processes contribute to the survival, reproduction, and dispersal of terrestrial and aquatic animal (vertebrate and invertebrate) species native to the Forest and provide for nesting or denning, habitat security, shelter, and forage (see also the plan components in the wildlife section).
- 05** Vegetation conditions provide sustainable levels of timber harvest and other forest products such as wood fiber, biomass, firewood, posts and poles, medicinal plants, tepee poles, mushrooms, and berries for commercial, tribal, personal, educational, and scientific uses.

Baseline carbon stocks (FW-DC-TE&V)

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

Vegetation composition (FW-DC-TE&V)

- 07** The Forest has a diversity of native tree species, with most stands composed of more than one tree species. Desired conditions for forest dominance types forestwide are described in table 2. Desired conditions for the forestwide presence (distribution) of individual tree species are described in table 3. Refer also to table 4 for desired conditions for the presence of individual tree species by each potential vegetation type.

Table 2. Desired conditions forestwide for coniferous forest dominance types^a (percentage of Forest in the dominance type)

Forest dominance type	Current condition ^b (%)	Desired range (%)
Ponderosa pine	0.4 (0-1.0)	0.5-5
Douglas-fir	18 (16-21)	15-25
Western larch	5.7 (4.2-7.3)	8-15
Lodgepole pine	15 (12-18)	10-20
Subalpine fir/Engelmann spruce	43 (39-47)	30-45
Grand fir/Western red cedar	1 (0.4-1.6)	0.2-1.5
Whitebark pine	2.4 (1.4-3.4)	0.5-5

a. Dominance type (see glossary) reflects the most common tree species in the stand.

b. Data source: Dominance Mid 40 attribute, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90 percent confidence interval. Reports run in 2016.

Table 3. Desired conditions forestwide for coniferous tree species presence^a (percentage of Forest where species is present)

Conifer species	Current condition ^b (%)	Desired range (%)
Ponderosa pine	0.9 (0.3-1.6)	2-8
Douglas-fir	35 (32-39)	30-55
Western larch	18 (15-21)	22-35
Lodgepole pine	26 (25-30)	20-35
Subalpine fir	61 (57-65)	55-74
Engelmann spruce	44 (41-48)	40-63
Grand fir	2.7 (1.6-4.0)	1-6
Western red cedar	1.3 (0.5-2.2)	0.5-5
Whitebark pine	11 (9-14)	13-20
Western white pine	1.6 (0.8-2.5)	3-10

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

b. Data source: Species presence attribute by R1 Broad Habitat Groups, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Inventory and Analysis (FIA) program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90% confidence interval. Reports were run in 2016.

- 08** Presence of tree species within each potential vegetation type meets or trends towards desired conditions, as described in table 4. The distribution of tree species provide desired habitat conditions for associated wildlife species and contribute to diverse and resilient forest conditions, as described in table 4. See appendix D for a description of potential vegetation types.

Table 4. Current and desired conditions by potential vegetation type for tree species presence (percentage of Forest within the potential vegetation type where particular species are present)

PVT	Current condition ^a (%)	Desired range (%)	Desired conditions
Warm-dry coniferous forest	Ponderosa pine: 4.2 (0.5-9.1) Douglas-fir: 76 (67-86) Western larch: 19 (11-28) Lodgepole pine: 28 (18-39)	Ponderosa pine: 15-50 Douglas-fir: 30-60 Western larch: 10-30 Lodgepole pine: 15-35	Ponderosa pine is very common and all sizes are represented. Douglas-fir is common but usually in mixed stands with ponderosa pine, larch, or lodgepole. Western larch is present on the more moist sites within this type, most often in mixed stands with ponderosa pine and Douglas-fir. Grand fir and subalpine fir may be present on some of the moister sites, usually in understory canopy layers.

PVT	Current condition ^a (%)	Desired range (%)	Desired conditions
			In areas determined to be big game winter habitat (determined in cooperation with MFWP), species with full crowns in winter (e.g., Douglas-fir and ponderosa pine) are well represented in all size classes, whereas western larch and to a lesser extent lodgepole pine occur as minor or codominant species.
Warm-moist coniferous forest	Ponderosa pine: not present Douglas-fir: 50 (36-64) Western larch: 52 (37-68) Western white pine: 11.4 (2.9-21) Lodgepole pine: 30 (16-44) Grand fir: 30 (15-45) Western red cedar: 22 (9.6-35) Subalpine fir: 44 (30-59) Engelmann spruce: 58 (44-72)	Ponderosa pine: 5-15 Douglas-fir: 40-70 Western larch: 45-80 Western white pine: 10-25 Lodgepole pine: 4-15 Grand fir: 10-36 Western red cedar: 15-30 Subalpine fir: 10-40 Engelmann spruce: 20-50	<p>Species composition is very diverse, both across the landscape and within stands. Western larch and Douglas-fir are the most common shade-intolerant species observed, especially in overstory tree layers and larger size classes. Western white pine is present on many sites, achieving codominance with other shade-intolerant species. Lodgepole pine is less common than other shade-intolerant species, usually present as a codominant or minor species. Ponderosa pine is uncommon but is present in some stands within this PVT. Western red cedar, grand fir, subalpine fir, and Engelmann spruce are commonly present in understory tree layers but are less commonly in overstory tree layers, except in riparian areas and lands immediately adjacent to streams, ponds, or wetlands. Groves of large, old western red cedar are present in portions of the most sheltered sites and wet areas.</p> <p>Areas in this type with presence of ponderosa pine contribute to flammulated owl habitat. Areas in this type with presence of western red cedar, western hemlock, western white pine, and western larch contribute to fisher habitat. In areas determined to be big game winter habitat (determined in cooperation with MFWP), species with full crowns in winter (e.g., Douglas-fir, ponderosa pine, western white pine) are well represented in all size classes, and western larch and to a lesser extent lodgepole pine occur as codominant or minor species.</p>
Cool-moist coniferous forest	Douglas-fir: 35 (31-40) Western larch: 19 (16-23) Lodgepole pine: 29 (25-33) Subalpine fir: 69 (65-73) Engelmann spruce: 54 (50-58) Western white pine: 1.6 (0.7-2.7) Whitebark pine: 6.9 (4.8-9.2)	Douglas-fir: 35-60 Western larch: 28-45 Lodgepole pine: 15-35 Subalpine fir: 69-85 Engelmann spruce: 45-73 Western white pine: 5-10 Whitebark pine: 6-16	<p>Species composition is diverse across the landscape, with stands commonly containing more than one tree species. Some pure or nearly pure stands of subalpine fir and Engelmann spruce, as well as lodgepole pine, occur. Subalpine fir and spruce are commonly present in understory tree layers. Douglas-fir and western larch trees are widespread across the landscape, contributing to species diversity, forest resilience and recovery after fire events.</p> <p>These conditions contribute to habitat for key species such as Canada lynx and provide high-quality habitat for cavity nesting/denning species.</p>

PVT	Current condition ^a (%)	Desired range (%)	Desired conditions
Cold coniferous forest	Lodgepole pine: 22 (14-30) Subalpine fir: 81 (75-88) Engelmann spruce: 40 (32-47) Whitebark pine: 38 (29-46)	Lodgepole pine: 20-35 Subalpine fir: 50-90 Engelmann spruce: 45-85 Whitebark pine: 55-85	Subalpine fir and Engelmann spruce are common in the cold type, particularly in basins and moist slopes. Lodgepole pine is also widely present, contributing to species diversity and recovery of forested conditions after fire. Whitebark pine is common, particularly on more exposed sites and other areas where this species has competitive advantage and is most likely to persist. Douglas-fir and western larch are uncommon but occasionally occur on some of the warmer sites within this PVT. Groves of alpine larch are rare but are present and persistent over time on suitable sites throughout this type. These conditions contribute to habitat for key species such as Canada lynx and Clark's nutcracker.

a. Data source: Species presence attribute by R1 Broad Habitat Groups, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Forest Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90 percent confidence interval. Reports were run in 2016.

- 09** Non-coniferous vegetation types are present across the Forest and meet the characteristics described in table 5. These communities provide habitat for associated wildlife species.

Table 5. Current and desired conditions forestwide for non-coniferous plant communities

Plant Community	Current condition ^a (%)	Desired range (%)	Desired Condition
Hardwood tree communities (primarily black cottonwood, paper birch, quaking aspen)	<u>Dominance type</u> 1.3 (0.4-1.9) <u>Species Presence</u> Cottonwood: 2.0 (1.0-2.9) Birch: 1.4 (0.7-2.3) Aspen: 0.9 (0.3-1.6)	<u>Dominance type (persistent community)</u> 1-2.5 <u>Species presence</u> 4-6 one or more of these species are present	Persistent ^b cottonwood communities occur across the forest in areas associated with high and/or fluctuating water tables, providing habitat for a wide variety of wildlife species. Very large black cottonwood trees occur along large, low-gradient streams where seasonal flooding sustains a variety of age and size classes and a variety of patch sizes from less than an acre to over 100 acres, depending upon site capability. Persistent aspen or paper birch communities are rare across the Forest but occur in areas such as seeps where soil conditions tend to severely limit coniferous forest development. Hardwood tree communities have a high diversity of in the understory. Transitional hardwood communities occur most commonly in the early successional stage, such as after a fire or harvest, where hardwood trees comprise 40% or greater of the tree canopy cover. These communities are most abundant on warm-moist types and in riparian areas. Through natural succession, coniferous species become more dominant, but hardwood species (especially aspen and birch) are present within these stands for several decades, providing habitat for a wide variety of wildlife species, including decayed hardwood trees for cavity nesters. Canopy gaps and small openings are periodically created over time within the coniferous forest landscape by disturbances (such as fire or harvest) to provide sites where hardwoods continue to successfully regenerate and/or grow into larger-sized trees. Refer also to desired conditions

Plant Community	Current condition ^a (%)	Desired range (%)	Desired Condition
			related to early successional and recently burned coniferous forest types (FW-DC-TE&V-10, 11, and 25).
Grass/forb/shrub communities	<u>Persistent communities</u> 5 <u>Transitional communities</u> See estimated percent for seedling/sapling size class and burned forest FW-DC-TE&V-10, 11, and 25	<u>Persistent communities</u> 5-7 <u>Transitional communities</u> See desired conditions for seedling/sapling size class and burned forest (FW-DC-TE&V-10, 11, and 25)	Grass/forb/shrub plant communities are dispersed widely across the Forest, including persistent types, providing habitat for a variety of wildlife species. The common types of grass/forb/shrub communities are (1) persistent ^b communities on mid- to high-elevation moist to wet sites; may be wet meadows or shrub dominated. Maintained by avalanches, a high water table, or harsh site conditions that slow or preclude establishment of trees. (2) persistent communities on mid- to low-elevation relatively dry sites; may be grass dominated but may also have abundant forbs and shrubs. Maintained by site and soil conditions that slow or preclude establishment of trees. (3) Transitional communities occurring within all forested potential vegetation types during the early successional stages after disturbances such as fire or harvest. This is the most common non-coniferous plant community type. It persists for one or more decades and is eventually replaced through natural succession by coniferous forest types.

- a. Data source: Dominance Mid 40 and species presence attribute, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90% confidence interval. Reports were run in 2016.
- b. For purposes of this desired condition, these plant communities are considered persistent if they remain hardwood- or grass/forb/shrub-dominated for 50 or more years.

Vegetation structure—Forest and tree size classes (FW-DC-TE&V)

- 10** A diversity of forest size classes occurs across the Forest. Desired conditions forestwide for forest size class proportions are described in table 6. Forest size class amount and distribution fluctuate over time and space as forests develop through natural succession and/or change in response to disturbances and may be limited by site productivity, species composition, and forest density.

Table 6. Current and desired conditions forestwide for coniferous forest size classes^a (percentage of NFS land on the Flathead National Forest)

Forest size class	Current condition ^b (%)	Desired range (%)
Seedling and sapling (< 5 inches d.b.h.)	14 (12-17)	7-38
Small tree (5-9.9 inches d.b.h.)	33 (30-36)	18-38
Medium tree (10-14.9 inches d.b.h.)	23 (21-26)	8-25
Large tree (15-19.9 inches d.b.h.)	10 (8.5-12)	20-43
Very large tree (≥ 20 inches d.b.h.)	5.8 (4.5-7.3)	6-20

- a. Defined as the *predominant* diameter class of live trees (see "forest size class" in glossary). A stand within a particular forest size class may contain trees of multiple diameters. For example, some very large trees (≥ 20 inches d.b.h.) may be present within stands classified as small, medium, or large forest size class.
- b. Data source: Forest size classes attribute, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90% confidence interval. Reports were run in 2016.

- 11** A diversity of forest size classes occurs within each potential vegetation type. The desired range forestwide is described in table 7. Forest size classes fluctuate over time and space as forests develop through natural succession and change in response to disturbances. These desired conditions, in combination with those described for composition, pattern, and other vegetation components in this plan, create habitat that supports a wide variety of wildlife associated with forests in the potential vegetation type.

Table 7. Current and desired conditions by potential vegetation type for forest size class (percentage of Forest within the type in the forest size class)

PVT	Forest size class ^a	Current condition ^b (%)	Desired range (%)
Warm-dry coniferous forest	Seedling/sapling	14 (7-21)	5-35
	Small	31 (22-41)	10-45
	Medium	21 (14-29)	8-30
	Large	13 (6.9-19)	15-35
	Very large	5.7 (2.1-10)	6-20
Warm-moist coniferous forest	Seedling/sapling	5.7 (0-13)	3-40
	Small	45 (32-59)	20-55
	Medium	35 (23-48)	5-30
	Large	9.1 (2.6-17)	10-40
	Very large	2.3 (0-6.3)	8-44
Cool-moist coniferous forest	Seedling/sapling	14 (11-17)	5-35
	Small	33 (29-37)	20-39
	Medium	24 (21-27)	5-20
	Large	11 (9-13)	25-48
	Very large	7.6 (5.6-9.7)	8-25
Cold coniferous forest	Seedling/sapling	19 (14-25)	10-35
	Small	38 (31-45)	10-32
	Medium	21 (15-27)	5-20
	Large	7.5 (3.9-12)	15-65
	Very large	2.2 (0.4-4.3)	2-5

a. Defined as the *predominant* diameter class of live tree component based upon trees per acre or basal area, depending upon tree size class. Seedling/sapling < 5 inches d.b.h.; small 5-9.9 inches d.b.h.; medium 10-14.9 inches d.b.h.; large 15-19.9 inches d.b.h.; very large ≥ 20 inches d.b.h.

b. Data source: Forest Size Classes by R1 Broad Habitat Groups, R1 Summary Data Base, Hybrid 2011, from data produced by the Forest Service's Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90% confidence interval. Reports were run in 2016.

- 12** Very large live trees (greater than 20 inches d.b.h.) are present not only in the very large forest size class (see FW-DC-TE&V-10 and 11) but are also distributed throughout other forest size classes across the matrix of Forest lands, including areas where timber harvest activities occur. Forest vegetation conditions support maintaining or increasing the density and distribution of very large live trees across the landscape. Desired species are listed in table 8. Very large live trees contribute to forest structural diversity, to long-term forest resilience, and to recovery after disturbances (such as fire). Very large trees contribute to future snag habitat in the late successional and old-growth forest, providing for long-term recruitment of large rotten trees, broken-top trees, and snags that are important habitat for species such as pileated woodpeckers, flammulated owls, lynx, fisher, and others. Very large trees contribute to scenic quality and to the economic value of forest products in areas suitable for timber production.

Table 8. Desired species of very large live trees (≥ 20 inches d.b.h.) by area.

Area	Desired conifer species in the very large tree size classes
Warm-dry PVT	Ponderosa pine, western larch on suitable sites
Warm-moist PVT	Western larch, western white pine, Douglas-fir, ponderosa pine, western red cedar, western hemlock
Cool-moist PVT	Western larch, Douglas-fir, western white pine on suitable sites
Cold PVT	Engelmann spruce, whitebark pine
Riparian management zones	Black cottonwood and the species listed for the PVT associated with the riparian area

Vegetation structure—Forest density (FW-DC-TE&V)

- 13** Forest densities range from very low to very high and occur in a diverse pattern across the landscape. Moderate and high tree densities (i.e., greater than or equal to 40 percent canopy cover) occur on 50 to 75 percent of the forested area and most commonly located in the cool-moist and warm-moist potential vegetation types. Forests at lower densities (i.e., less than 40 percent canopy cover) occur on up to 50 percent of the forested area and are most commonly located in the warm-dry potential vegetation type; on the drier and colder sites within the cool-moist and cold potential vegetation types; and in the wildland-urban interface. Forests at lowest densities also occur in seedling/sapling forest size classes.

Forest densities contribute to ecological, social, and economic desired conditions at the stand and landscape scales, including:

- Wildlife habitat, e.g., providing cover and foraging conditions for many species including Canada lynx and flammulated owl, and facilitating tree growth for development of very large trees and future old-growth forest.
- Forest resilience, e.g., reducing competition, improving tree vigor and growth, and reducing forest fuels in areas of the wildland-urban interface.
- Timber productivity on lands suitable for timber production, e.g., maintaining adequate tree growth rates and stocking levels

Vegetation structure—Old-growth forest (FW-DC-TE&V)

- 14** Forest conditions support the maintenance of existing amounts of old-growth forest and foster an increasing trend in the amount, patch size, and connectivity of old-growth forest into the future, especially in the warm-dry and warm-moist potential vegetation types. Old-growth forest provides conditions that create habitat for old-growth-associated wildlife species. Old-growth forest is distributed widely across the Forest. Forestwide and within individual watersheds, the distribution, patch size, and amount of old-growth forest varies over time, depending upon forest development stage and the influence of climate and natural disturbances. Desired ecological conditions for old-growth forest are displayed in table 9. Refer to glossary for definition of old-growth forest.

Table 9. Current^a and desired conditions for old-growth forests forestwide and by potential vegetation type

Potential vegetation type	Desired composition, structure, and other ecological conditions of old-growth forests
General forestwide conditions	<p>Current estimate: 9.5% old-growth forest (7.75-11.48).</p> <p>Old-growth forest is resistant and/or resilient to disturbances or other impacts that might result in loss of old-growth forest characteristics such as stand-replacing fire, epidemic levels of insects or disease, and severe drought. Natural succession continues to add to the amount and distribution of old-growth forest and habitat across the Flathead. Natural disturbances such as fire continue to return old-growth forest to early successional conditions across portions of the Forest. However, they provide high-quality snag habitat, and some areas have surviving large or very large trees that provide seed for re-establishment of desirable species and contribute to increased forest structural diversity and wildlife habitat values.</p> <p>Large patches of old-growth forest are available and connected to provide for the needs of old-growth-associated wildlife species. Old-growth forest contains associated components that contribute to high-quality conditions for these species such as very large snags, very large live trees (including those with heart rot or broken tops), large-diameter downed woody material, and a diversity of tree size classes and canopy layers.</p>
Warm-dry	<p>Current estimate: 9.5% old-growth forest (4.76-15.00)</p> <p>Ponderosa pine is the most common species in the large and very large live tree classes, with western larch present on moister sites. These two species are the dominant snags and defective live trees, with some trees attaining a large enough size to survive repeated fires. Large and very large Douglas-fir is also present. Forest canopy is relatively open, with low to moderate forest densities. Forest structure is either single canopy or small-patch mosaic (patches typically less than one acre) where there are two or more tree size classes interspersed with patches of shrubs, forbs, and grasses.</p>
Warm-moist	<p>Current estimate: 3.8% old-growth forest (0-9.21)</p> <p>Western larch is the most common species in the large and very large live tree size classes, followed by Douglas-fir. These two species are the dominant snags and defective live trees, with some trees attaining a large enough size to survive repeated fires. Large and very large western white pine is common on many sites. Western red cedar is often present in the mid- and understory canopy layers. Groves of very large, old western red cedar exist in the more sheltered areas within this potential vegetation type. Though less common, very large ponderosa pine is also present within some old-growth forest. Tree density is typically moderate to high, with multiple tree sizes and canopy layers often occurring in a small-patch mosaic pattern. In some areas, particularly where ponderosa pine is present, more open canopy conditions (e.g., less than 40 percent canopy cover) may be associated with old-growth forest and habitat. In these areas, fire resistant species dominate (e.g., in the Swan Valley geographic area).</p>
Cool-moist	<p>Current estimate: 10.9% old-growth forest (8.43-13.46)</p> <p>Western larch and Douglas-fir are the most common species in the large, old tree class. These two species are the dominant snags and defective live trees, with some trees attaining a large enough size to survive repeated fires. Large, old Engelmann spruce are common in riparian areas and other sites with high soil moisture. Overall tree density is moderate to high, with wide diversity in tree sizes. Stands are composed of two or more canopy layers. Small gaps in upper canopy layers often occur and are associated with dense patches of understory trees.</p>
Cold	<p>Current estimate: 8.7% old-growth forest (4.55-13.43)</p> <p>Engelmann spruce is the most common species in the large, old tree class. Older and larger subalpine fir and lodgepole pine are also present. Over time, whitebark pine becomes more common in some portions of this type and eventually attains a size and age that both provides seed for regeneration after fire and has the potential to survive repeated low- to moderate-severity fires. Tree density varies depending upon soil development and climatic conditions.</p>

a. Data source: Old-growth attribute in the R1 Summary Data Base, summarized by R1 Broad Habitat Groups. Data produced by the Forest Service's Inventory and Analysis program. Estimated mean across all the Forest's NFS land, displaying lower and upper bounds at 90% confidence interval. Reports were run in 2016.

Vegetation structure—Snags and downed wood (FW-DC-TE&V)

- 15** Desired conditions for snag densities across the Forest are displayed in table 10. At the landscape scale, snag presence, distribution, density, size, and species are highly variable both spatially and over time. Individual stands or sites may have no snags in these size categories or a much higher number of snags per acre, depending upon the unique conditions and disturbance history. The highest densities of snags are generally found in the areas with lower direct human influence, such as wilderness or unroaded areas, in riparian management zones, and in areas that have burned in the recent past or have had recent insect and disease infestations. The lowest densities of snags are found in areas where concern for fire hazard is elevated (such as in portions of the wildland-urban interface); in fuel breaks; in areas with concern for human safety (such as developed recreation sites); and in areas within 200 feet of open roads accessible to firewood cutting (especially those close to human communities). Snags suitable for nesting and denning, particularly in very large sizes (i.e., greater than 20 inches d.b.h.), are present not only in old-growth forests but across the matrix of forest lands, contributing to the diversity of forest structure and to the sustainability of wildlife and pollinator species associated with snags (such as flammulated owls and fisher).

Table 10. Desired minimum in average snags per acre of conifer species, as measured across all forested acres of the Forest, by forest dominance type, potential vegetation type, and snag diameter

Forest dominance types	Potential vegetation type	Desired minimum in average number of snags per acre greater than or equal to 10 inches d.b.h.	Desired minimum in average number of snags per acre greater than or equal to 15 inches d.b.h.	Desired minimum in average number of snags per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	5.0	2.9	0.7
All except lodgepole pine	Warm-moist	13.0	5.9	1.8
All except lodgepole pine	Cool-moist	15.0	4.0	1.2
All except lodgepole pine	Cold	10.0	3.0	0.9
Lodgepole pine	All	6.0	1.0	0.1

- 16** Snags contribute to cavity habitat distribution in managed areas of the Forest in the short and long term. Snags or decaying and broken-topped live trees greater than 20 inches d.b.h. are present, predominantly ponderosa pine or western larch (which have the greater longevity and value as snags), providing habitat for primary cavity nesters (a variety of woodpecker species), secondary cavity-nesters (such as flammulated owls), and mammals (such as marten and fisher). These and other snags greater than 15 inches d.b.h. are also available for boreal owls, chickadees, bluebirds, and numerous other species associated with tree cavities.
- 17** Downed wood, especially the larger material (9 inches or larger in diameter), is present across the matrix of forested lands, contributing to forest structural diversity, soil ecological function, and habitat for wildlife species associated with downed wood for feeding, denning, resting, and cover such as pollinators, Canada lynx, grizzly bears, pileated woodpeckers, marten, and fisher. The desired condition for downed wood is displayed in table 11, which is expressed as a forestwide minimum average amount across all forested acres within each potential vegetation type. Downed wood is highly variable in amount, sizes, species, and stages of decay, both across the landscape and over time. Specific stands or sites may have much lower or higher amounts of downed wood

per acre, depending upon the unique conditions, site-specific management objectives, and disturbance history. Lowest amounts of downed wood (e.g., less than 10 tons per acre) are found in areas where concern for fire hazard is elevated, such as in portions of the wildland-urban interface and in areas within 200 feet of open roads accessible to firewood cutting. Highest amounts are generally found in areas that have experienced fire or insect and disease infestations more than 10 years previously and in riparian management zones.

Table 11. Desired minimum for average total tons per acre downed wood, as measured across all forested acres within each potential vegetation type on the Forest

Potential vegetation type	Desired minimum in total tons per acre as a forestwide average
Warm-dry	14
Warm-moist	22
Cool-moist	25
Cold	15

Landscape pattern (FW-DC-TE&V)

- 18** Early successional (seedling/sapling size class) forest patches form a landscape pattern consistent with the natural range of variation. Early successional forest patches have distinctive conditions (tree size, forest structure, understory vegetation) that contrast sharply with adjacent forests and create functional openings until sufficient regrowth of trees occurs. These conditions influence the activity and patterns of ecosystem processes (e.g., fire, insects, and disease) across the landscape and contribute to resilience at multiple scales. Table 12 displays the natural range of variation for average patch size of early successional forest, forestwide and by potential vegetation type.

Table 12. Natural range of variation^a (acres) for early successional forest patches (seedling/sapling size class), forestwide by potential vegetation type (PVT)

Scale/PVT	Natural range of variation Average patch size	Natural range of variation Weighted average patch size ^b
Forestwide	171-442	37,700
Warm-dry	84-134	15,900
Warm-moist	74-128	4,100
Cool-moist	133-247	16,900
Cold	70-102	960

a. Data Source: Estimated natural range of variation in seedling/sapling forests patches created by disturbances (stand-replacement fire), using the SIMPPLLE model. Natural range of variation values are global averages (average of the averages). All land ownerships are included in the natural range of vegetation analysis.

b. Weighted by size of patch; thus, larger patches have greater influence on the average value.

- 19** Forest patterns contribute to connectivity of habitat for wildlife (e.g., Canada lynx, marten), movement within and between home ranges, and dispersal between populations. Desired conditions related to forest patterns across the landscape and within potential vegetation types are described below.

Forestwide: The forestwide pattern of forest patches trends towards the spatial and temporal arrangement that would occur under the natural fire regimes within this ecosystem (refer also to FW-TE&V-DC-25). Forest patches across the landscape vary widely in size, shape, and conditions (such as tree density, tree sizes, and number of canopy layers). The patch sizes and shapes of early successional seedling/sapling forest openings (less than 5 inches d.b.h.) are highly variable. They

are dispersed widely and interspersed among patches of small, medium, and large forest size classes. The majority of seedling/sapling patches are less than 300 acres in size, but very large patches (those greater than 30,000 acres) may exist on the Forest, although less commonly (e.g., they may exist for one 20-year period over a 100-year time span). The largest seedling/sapling patch sizes occur predominantly within wilderness and large unroaded areas. The forestwide pattern of patches of small, medium, and large forest size classes (greater than or equal to 5 inches d.b.h.) also trends towards larger interconnected patches, as would occur under the natural range of variation.

Warm-dry type: Forest patterns in this type trend towards the spatial and temporal arrangement that might occur in a mixed-severity fire regime, where low- to moderate-severity burn conditions are most common. High-severity fires may have occurred periodically but are infrequent, generally smaller in size than on cool-moist types. Large-diameter trees capable of surviving fire occur across most of the area (e.g., ponderosa pine, Douglas-fir, and western larch). Forest patches of different sizes, shapes, and forest conditions form a complex and diverse pattern, resulting from both active vegetation management such as timber harvest and prescribed fire and natural processes such as succession. Across the landscape, early successional patches are interspersed with similarly sized patches dominated by medium- and larger-sized trees, often with relatively open midstory canopies. Small grass, forb, or shrub-dominated vegetation types occur within this matrix where gaps in the forest canopy or a very open-canopy forest are present. The larger early successional seedling/sapling-dominated patches (e.g., several hundred acres in size) generally occur in wilderness and large unroaded areas. Smaller clumps or patches (5 to 180 acres in size) of seedling/sapling-dominated forest are more common, particularly outside the unroaded areas. Within these patches, larger overstory trees are often present as scattered individuals, small groups, or patches. This diverse forest structure persists as the seedling/sapling trees grow into the small, medium, and large forest size classes.

Forests in the warm-dry type provide habitat for a variety of wildlife species over long time frames as climate, forest, and landscape conditions change. Disturbances create conditions suitable for the regeneration and maturation of ponderosa pine trees, promoting seed-producing trees that provide forage for wildlife species such as Clark's nutcrackers. Flammulated owls have a mosaic of patches of snags for nesting; dense patches of small Douglas-fir, ponderosa pine, and western larch for roosting; and openings for feeding. The mosaic pattern of forest conditions also consists of patches of large, full-crowned overstory trees that reduce snow depths, interspersed with patches of dense young trees and shrubs in the understory that provide food and shelter from the wind, which provides winter habitat for white-tailed deer and other big game species during harsh winters. Processes (e.g., fire, insect infestation and disease, vegetation management) that create diverse patches and patch sizes also create forest groundcover consisting of a variety of grasses, forb, and shrub species that provide wildlife forage and nesting sites. Wildlife species are able to move between patches of foraging and denning or nesting habitat.

Warm-moist type: Forest patterns in this type trend towards the variation that might occur in a mixed-severity fire regime, where low- and moderate-severity burned conditions are common. High-severity fires may have occurred periodically but are infrequent. Large-diameter trees capable of surviving fire (e.g., western larch, ponderosa pine, Douglas-fir, and western white pine) occur across most of the area. Forests form a complex, diverse pattern of conditions across the landscape and result primarily from active vegetation management (including timber harvests and limited use of fire) and from natural forest succession. Early successional seedling/sapling forests (< 5 inches d.b.h.) are interspersed across the landscape, with similarly sized forest patches dominated by small, medium, and larger tree sizes. Early successional seedling/sapling-dominated patches may be

large (250 acres or more) but more often occur as smaller patches (20 to 200 acres in size). Within these patches there are usually live, fire-tolerant overstory trees present, from small to large size trees, as scattered individuals, small groups, or patches.

Forests in the warm-moist type provide habitat for a variety of wildlife species over long time frames as climate, forest, and landscape conditions change. From a wildlife standpoint, there are two sets of desired conditions for this potential vegetation type: one for forests where ponderosa pine, Douglas-fir, and western larch are the predominant species and one where western red cedar, western white pine, and western larch are the predominant species. For forests where ponderosa pine, Douglas-fir, and western larch are the predominant species (e.g., in the Swan Valley), desired conditions are as described above for the warm-dry potential vegetation type. For forests where western red cedar, western white pine, and western larch are the predominant species, desired conditions for the forest pattern are as follows.

Over time, forest stands will trend towards multiple canopy layers, with shade-tolerant species (e.g., grand fir, western red cedar) occupying the understory layers and larger-sized, usually fire-tolerant species (e.g., western white pine, western larch, Douglas-fir, western red cedar) dominating the overstory layers. Interconnected, complex patches of very large old cedar, hemlock, or western larch with heart rot provide denning and resting habitat for species such as fisher in a landscape mosaic of mature and young forest. The species, density, and size of overstory tree species vary widely, depending on factors such as site capability, stand history, and successional development. The mosaic pattern of forest conditions trends towards larger, interconnected patches of dense, mature trees that reduce snow depths, interspersed with patches of young trees and a complex structure that provides foraging habitat and shelter.

Processes (e.g., fire, wind, insects, and disease) that create diverse patches and patch sizes also create forest groundcover consisting of windblown lichens and a variety of grasses, forb, and shrub species. Other than in areas of recent natural disturbance (such as stand-replacing wildfire or epidemic insect infestation), patches of shrubs and coniferous trees in the small to very large size classes (> 5 inches average d.b.h.) trend towards larger, more interconnected patches, allowing animals such as lynx, fisher, and marten to move within and between home ranges. The width and distribution of patches are highly variable due to environmental conditions that change over time (e.g., disturbance, forest succession), so their location changes over time. Areas providing cover are interspersed with more open areas providing spring, summer, and fall forage for species such as grizzly bears, elk, and mule deer.

In Canada lynx habitat and critical habitat (see map B-14), a mosaic of successional stages promotes the conservation of the Canada lynx and its critical habitat at the lynx analysis unit scale as well as at larger scales. Except in portions of the wildland-urban interface, young forests with high horizontal cover of abundant tall shrubs/dense saplings are interspersed with older forests, which provides food and cover for snowshoe hares (the primary prey of Canada lynx).

Cool-moist type: Forest patterns generally reflect the natural variation that might occur where moderate- and high-severity fire are prevalent, although very large high-severity fires occur infrequently. Natural disturbance processes (such as insects, disease, fires, avalanches) as well as vegetation management create patches of different tree sizes, species, and stand structures within the larger patch matrix. A mosaic pattern composed of relatively large patches of different forest size classes tends to occur across the landscape. Early successional openings (< 5 inches d.b.h.) across this landscape range from less than one hundred to several thousand acres in size. Even-aged, single canopy forest patches of shade-intolerant species (e.g., lodgepole pine, western larch, and Douglas-fir) are common, particularly in the early (seedling/sapling) and mid-successional

stages of forest development. Over time, large patches of even-aged forest trend towards more diversity in size and structure as dense understory canopy layers of shade-tolerant trees (subalpine fir and spruce) develop and smaller disturbances occur that alter forest structures. Larger-sized, usually fire-tolerant species (e.g., western larch and Douglas-fir) occur in a discontinuous pattern across the landscape, sometimes in large patches and sometimes as scattered individual trees in younger stands, having survived one or more fire events.

Forests in the cool-moist potential vegetation type provide habitat for a variety of wildlife species over long time frames as climate, forest, and landscape conditions change. Processes (e.g., fire, wind, insects, and disease) that create diverse patches and patch sizes also create forest groundcover consisting of a wide variety of plant species that produce berries for grizzly bears as well as willow, alder, or yew that provide cover and forage for species such as snowshoe hares and moose. The more gently sloped moist basin areas are more densely stocked (e.g., 40 to 60 percent canopy cover), providing cover interspersed with more open areas providing spring, summer, and fall forage for species such as elk, moose, and mule deer.

Other than in areas of recent natural disturbance (such as stand-replacing wildfire or epidemic insect infestation), patches of shrubs and coniferous trees in the small to very large size classes (> 5 inches average d.b.h.) trend towards larger, more interconnected patches, allowing animals such as lynx, fisher, and marten to move within and between home ranges. The width and distribution of patches are highly variable due to environmental conditions that change over time (e.g., disturbance, forest succession), so their locations change over time.

In Canada lynx habitat and critical habitat (see figure A-1), a mosaic of successional stages promotes the conservation of the Canada lynx at the lynx analysis unit scale as well as at larger scales. Except in portions of the wildland-urban interface and in areas recently affected by large stand-replacing wildfire, the connectivity of mature forest as well as the patch shape and adjacency of mature to young regenerating forest provides habitat capable of contributing to lynx reproductive success. Patches of dense, young seedling/sapling forest and mature multistory forest have branches touching the snow surface. Young forests with extremely high densities (greater than 14,000 stems per acre) occur following fires but are interspersed in a mosaic with young forests of much lower densities that are developing a multistoried stand structure. Large, stand-replacing wildfires may make large areas of lynx habitat temporarily unsuitable, but over time forest conditions within post-fire landscapes promote development of snowshoe hare and lynx habitat to support long-term persistence of lynx populations.

Cold type: Forest patterns across the area generally reflect the variation that might occur in a mixed-severity fire regime where low-, moderate-, and high-severity fires would occur. A very diverse mosaic pattern of vegetation conditions occurs, reflecting both the influence of natural disturbances and the complex arrangement of site and environmental conditions that prevent or delay the establishment and growth of trees. Variable size patches of small, medium, or large trees are intermingled with small and large grass/forb/shrub openings and other non-forest types such as avalanche chutes or high-elevation rocklands. Forest characteristics within patches are variable, usually composed of multiple canopy layers, tree ages, and size classes. The size of early successional seedling/sapling forest patches, originating mainly from fire, ranges from small (e.g., 20 acres) to large (e.g., several thousand acres).

Forests in the cold type provide habitat for a variety of wildlife species over long time frames as climate, forest, and landscape conditions change. Processes (e.g., fire, wind, insects, and disease) that create diverse patches and patch sizes also create openings in moister or more protected sites that support grass, forb, and shrub species that provide forage for a variety of wildlife. Harsh

climate and fires create conditions suitable for regeneration and maturation of whitebark pine trees, particularly on dry and exposed ridges and slopes, resulting in seed-producing trees that provide forage for wildlife species such as Clark's nutcrackers. The more gently sloped, moist basin areas are more densely stocked (e.g., 40 to 60 percent canopy cover), providing cover interspersed with more open areas that offer spring, summer, and fall forage for species such as grizzly bears, elk, and mule deer and allowing animals to move within and between home ranges.

In Canada lynx habitat and critical habitat (see figure A-1), a mosaic of successional stages promotes the conservation of the Canada lynx at the lynx analysis unit scale as well as at larger scales. Other than in areas where harsh conditions limit tree growth or in areas of recent stand-replacing wildfire, the connectivity of mature forest, as well as the patch shape and adjacency of mature to young regenerating forest, provides habitat capable of contributing to lynx reproductive success. The width and distribution of patches are highly variable due to environmental conditions that change over time (due to disturbance, forest succession, etc.), so their locations change over time. Patches of dense, young, seedling/sapling forests and mature multistory forest have branches touching the snow surface. Young forests with extremely high densities (greater than 14,000 stems per acre) occur following fires but are interspersed in a mosaic with young forest of much lower densities that are developing a multistoried stand structure. Large, stand-replacing wildfires may make large areas of lynx habitat temporarily unsuitable, but over time forest conditions within post-fire landscapes promote development of snowshoe hare and lynx habitat to support long-term persistence of lynx populations.

Ecosystem processes—Fire, insects, and disease (FW-DC-TE&V)

- 20** Native insect infestations and disease activity occur periodically within the range of natural variability, influencing forest successional processes and providing structural features such as snags and downed wood that contribute to fish and wildlife habitat.
- 21** Relatively low levels of insect and/or disease activity and associated tree mortality occur in areas where fire hazard or human safety is of concern (e.g., wildland-urban interface, developed recreation sites). Salvage within forests with fire mortality, insect infestations, or disease may occur in certain circumstances, as described in other sections of this forest plan (see the Forest Vegetation Products: Timber section and suitability determinations under each management area).
- 22** Forest stands and landscapes have the necessary conditions (e.g., structure, composition, pattern) to be resilient and resistant to non-native insects and diseases.
- 23** Planned and unplanned (natural) ignitions are managed forestwide to promote fire as an ecological process, recognizing and upholding the natural role of fire in effecting change by creating, restoring, and maintaining the desired structure, composition, and pattern of vegetation and the resilience of the ecosystem over time. See also Fire and Fuels Management, FW-DC-FIRE-03 and 04.
- 24** Desired ecological conditions in large, unroaded landscapes (such as wilderness, recommended wilderness, and portions of the backcountry management areas) are primarily achieved as a result of natural ecological processes and disturbances such as fire (both planned and unplanned ignitions) and insect or disease activity. Outside of these landscapes, human influences and actions such as fire suppression or timber harvesting are more evident and play a larger role in achieving desired ecological conditions.

- 25** Planned and unplanned ignitions occur periodically and create recently burned forest conditions (a fire event within the preceding 10 years) that trend towards desired conditions for plant and wildlife species associated with burned forest (such as the black-backed woodpecker and northern hawk owl). Recently burned forests are consistent with the natural range of variation at the landscape scale. Salvage within burned forests to meet desired conditions may occur in certain circumstances, as described in other sections of this forest plan (see Forest Vegetation Products: Timber section and suitability determinations under each management area). Desired characteristics for recently burned forests are described in table 13.

Table 13. Estimated natural range of variation and desired conditions forestwide for recently burned forest conditions (forests that have had a fire event within the preceding 10 years)

Severity	Natural range of variation ^a	Desired condition
Moderate- (greater than 40% mortality of trees in small to large size classes) to high-severity recently burned forest (greater than 70% mortality of trees)	1-18% of NFS lands	<p>Recently burned forest conditions in areas that burn with moderate to high severity are distributed across the Forest and vary widely in amount, pattern, and frequency over time and space. Very few acres of burned forest may exist in cool and/or moist climatic periods; greater acreages exist in warm and/or dry climatic periods. Recently burned forest conditions are most consistent with the natural range of variation in wilderness areas and larger unroaded areas, which will have the majority of acres burned, the greatest number of dead trees, and the largest patch sizes. Burned patches may be over 20,000 acres in size in these areas, though events that create these larger patches occur infrequently. Outside the wilderness and large unroaded areas, burned forests will occur over fewer acres overall and patch sizes are smaller (e.g., less than 1,000 acres), especially in the warm-moist and warm-dry types.</p> <p>Recently burned forest conditions are characterized by an abundance of native grasses, forbs, and shrubs that provide forage for wildlife (such as big game species, small mammals, and birds) along with low to very high densities of fire-killed trees. In areas burned with moderate severity, individuals or small patches of live overstory trees survive the fire. Within a few years, coniferous tree seedlings (and aspen and birch on some sites) are widespread and eventually dominate most burned sites. Periodically, fire-killed conifers in a range of sizes from 9 to over 20 inches d.b.h. are present at the forestwide scale for nesting and feeding by black-backed woodpeckers and other wildlife species associated with forest patches that burn with moderate to high severity.</p>
Low-severity recently burned forest (less than 30% mortality of trees in medium and larger size classes)	0-2% of NFS lands	<p>Recently burned forest conditions in areas that burn with low severity are uncommon across the Forest, with most occurring on the warm-dry potential vegetation type and with small amounts on the warm-moist, cool-moist, and cold types. Patch sizes and patterns of forest burned at low severity are highly variable and are dictated mainly by the pattern of forest conditions (tree species, densities, amount of downed fuels) and site variations (potential vegetation type, topography) across the landscape. Low-severity burned forest conditions most commonly occur as smaller patches within the larger moderate- to high-severity burned forest conditions. Larger patches of low-severity burn conditions may occur on harsher sites on the cold potential vegetation type and in warm-dry types with ponderosa pine present.</p> <p>In patches burned at low severity, tree density is reduced, but many, if not most, trees survive the fire, particularly those in the medium and larger tree size classes and the fire-tolerant species (e.g., ponderosa pine, Douglas-fir, western larch, and whitebark pine). Mortality is mostly in small tree sizes (e.g., less than 9 inches d.b.h.) and in species sensitive to fire, such as lodgepole pine and subalpine</p>

Severity	Natural range of variation ^a	Desired condition
		fir. Low-severity burned sites support an abundance of native grasses, forbs, and shrubs that provide forage for wildlife (such as big game species, small mammals, and birds). Live tree densities are low to moderate. Fire-scorched conifers over 20 inches d.b.h. are present for cavity nesting or denning species. Smaller snags are abundant in some areas, depending on pre-fire conditions.

a. Source: Estimated natural range of variation in amount of fire per decade, using the SIMPPLLE model. The amount of fire is based on decadal variation (i.e., amount over a 10-year period).

Objectives (FW-OBJ-TE&V)

- 01** Vegetation management treatments (e.g., timber harvest, planned ignitions, thinning, planting) occur on 62,000 to 174,000 acres of the Forest to maintain or move towards achieving desired conditions for coniferous forest types and associated wildlife species, and for other resources.
- 02** Vegetation management treatments (e.g., timber harvest, planned ignitions, thinning, planting) occur on 16,000 to 21,000 acres of the Forest to contribute to restoration of blister rust-resistant western white pine and achieve desired conditions for this species' presence across the landscape.
- 03** Vegetation management treatments (e.g., timber harvest, planned ignitions, thinning, planting) occur on 500 to 5,000 acres of the Forest to contribute to restoration of diverse native hardwoods and associated wildlife species.
- 04** Vegetation management treatments (e.g., planned ignitions, slashing, control of non-native, invasive plants) occur on 1,500 to 5,000 acres of the Forest to promote persistence of grass/forb/shrub plant communities, focusing on key habitats for big game species and pollinators, to improve conditions for native plant establishment and growth and reduce non-native plants.

Standards (FW-STD-TE&V)

- 01** In old-growth forest, vegetation management activities must not modify the characteristics of the stand to the extent that stand density (basal area) and trees per acre above a specific size and age class are reduced to below the minimum criteria in Green et al.¹³ Vegetation management within old-growth forest (see glossary) shall be limited to actions that
 - maintain or promote old-growth forest characteristics and ecosystem processes;
 - increase resistance and resilience of old-growth forest to disturbances or stressors that may have negative impacts on old-growth characteristics (such as severe drought, high-severity fire, epidemic bark beetle infestations);
 - reduce fuel hazards in the wildland-urban interface; or
 - address human safety.
- 02** Standard VEG S6 (as modified by the Forest, indicated in bold type below), see appendix A. The standard states:

¹³ P. Green, J. Joy, D. Sirucek, W. Hann, A. Zack, & B. Naumann (2011), *Old-growth forest types of the Northern Region (1992, with errata through 2011)*, Missoula, MT: USDA Forest Service, Northern Region, planning record exhibit # 00504.

Vegetation management projects that reduce snowshoe hare habitat in mature multistory forests 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 or genetic tree tests evaluating genetically improved reforestation stock; or
3. For incidental removal during salvage harvest (e.g., removal due to location of skid trails); or
4. **For noncommercial felling of trees larger than sapling size within 200 feet of whitebark pine trees (in stands that contain trees identified for cone/scion/pollen collection) to make whitebark pine more likely to survive wildfires, more resistant to mountain pine beetle attack, and more likely to persist in future environments.**

Exceptions 2, 3, and 4 shall only be utilized in lynx analysis units 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-aged or even-aged management systems could be used to create openings in coniferous forests in the stem exclusion structural stage where there is little understory so that new forage can grow).

Where and to what this applies: Lynx habitat within lynx analysis units and to all vegetation management projects except for fuel treatment projects within the wildland-urban interface as defined by Healthy Forest Restoration Act, subject to the following limitation:

Fuel treatment projects within the wildland-urban interface that do not meet standards VEG S1, VEG S2, VEG S5, and VEG S6 shall occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (an administrative unit is a national forest).

For fuel treatment projects within the wildland-urban interface, see guideline VEG G10 in appendix A.

Exceptions to standard: This standard does not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, or roads. This standard does not apply to linkage areas (standard VEG S6).

- 03** Within timber harvest areas, snags and/or live snag replacement trees shall be retained at minimum levels that vary depending upon the geographic area and whether the harvest is within a riparian management zone. Refer to snag retention standards located under each geographic area in chapter 4 of the plan. Refer to FW-GDL-RMZ-10 for additional snag management direction for harvest areas within riparian management zones.

Guidelines (FW-GDL-TE&V)

- 01** 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 time period; areas with low levels of human activity should be provided adjacent to areas with high levels of disturbance). Note: Management activities such as pre-commercial thinning, burning, weed spraying, and implementation of road best management practices may need to be completed during the spring time period in order to meet resource objectives (especially if needed

to prevent resource damage), in which case other measures should be used to reduce the risk of disturbance (e.g., limiting the duration of the activity or limiting the use of closed roads).

- 02** 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.
- 03** 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).
- 04** Within the NCDE primary conservation area, vegetation management projects (including timber sales and other non-commercial vegetation management contracts) should include a provision providing for modification, cancellation, suspension, or temporary cessation of activities, if needed, to resolve grizzly bear-human conflict situations.
- 05** To reduce the risk of grizzly-bear human conflicts within the NCDE primary conservation area, vegetation management activities designed to enhance grizzly habitat (e.g., to increase huckleberry production) should not occur in or next to campgrounds, administrative facilities, or other developed recreation sites that operate during the non-denning season.
- 06** To increase the patch size of old-growth forest in the future, if managing vegetation within 300 feet of existing old-growth forest, treatment prescriptions that would promote the development of old-growth forest in the future should be considered. At a minimum, the following structural and composition components associated with old-growth forest should be retained if present within at least 300 feet of the old-growth forest patch:
 - larger live trees (e.g., greater than 17 inches d.b.h.) of species and condition that will persist over time (such as western larch, ponderosa pine, Douglas-fir) and not cause unacceptable impacts to future stand conditions (e.g., dwarf mistletoe infection or potential dysgenic seed source);
 - large downed wood (greater than 9 inches diameter); and/or
 - snags and decayed, decadent trees greater than 15 inches d.b.h.

Exceptions to this guideline may occur to protect human health and safety and within portions of the wildland-urban interface where decreased fuels are determined necessary to protect values at risk.

- 07** To maintain connectivity and avoid adverse impacts to old-growth forest, new road construction or reconstruction should not be located within old-growth forest. Exceptions may occur, such as when there are no feasible alternative road locations.
- 08** To contribute to maintenance of soil function and provide desired habitat and forest structural diversity for wildlife within timber harvest units, a minimum of approximately eight tons per acre of downed woody material greater than 3 inches in diameter should be retained within the unit. Retained material should consist of the longest and largest pieces present and, where possible, of intact pieces of a variety of species, sizes, and stages of decay, including cull tree tops and cull logs. The maximum amount of total downed woody material should generally not exceed 30 tons per

acre. Exceptions to this guideline may occur, such as where there is insufficient material prior to harvest, to protect human health and safety, within developed recreation sites, or where decreased fuels are desired to influence expected fire behavior and protect identified assets (e.g., within the wildland-urban interface).

- 09** When implementing even-aged regeneration harvest prescriptions (e.g., a clearcut, seedtree, shelterwood cut, including final removal cut), a minimum of three live reserve trees per acre of suitable western larch or ponderosa pine trees greater than 17 inches d.b.h. should be retained where present within each regeneration harvest unit or as averaged across a combination of regeneration harvest units. The intent is to contribute to the maintenance and/or development of very large trees, particularly of the species that have the potential to survive fire and contribute to diverse forest structure. Suitable trees include those that would not cause unacceptable impacts to regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source). Alternative species, size, and condition of trees should be considered for retention where suitable western larch or ponderosa pine trees greater than 17 inches d.b.h. are not present.
- 10** In vegetation treatment units within 1/2 mile of rivers or waterbodies larger than 40 acres suitable for bald eagle nesting, live ponderosa pine, western larch, or black cottonwood trees greater than or equal to 20 inches d.b.h. should be retained to provide bald eagle nesting and roosting habitat (the number and location of trees to be retained will vary on a site-specific basis).

Native Plant and Wildlife Species Diversity

Introduction

The 2012 planning rule adopts a complementary ecosystem- and species-specific approach, known as a coarse-filter/fine-filter approach, to provide for the diversity of plant and animal communities and the long-term persistence of native species in the plan area. The coarse-filter plan components are designed to maintain or restore ecological conditions for ecosystem integrity and ecosystem diversity in the plan area. Coarse-filter plan components are discussed in the Terrestrial Ecosystem and Vegetation, Riparian Management Zones, and Aquatic Ecosystems sections.

Coarse-filter plan components for aquatic, riparian, and terrestrial ecosystems provide for the needs of most plant and wildlife species. Fine-filter plan components are designed to provide for additional specific habitat needs for native plant and animal species when those needs are not met through the coarse-filter plan components. Subsections below display plan components for species that are currently listed by the USFWS as a threatened, endangered, proposed, or candidate species; species that are currently listed as species of conservation concern (see glossary) by the Forest Service regional forester; as well as other wildlife species that may be sensitive to particular types of human disturbance or may need additional habitat protection at particular sites at a particular time of year. The status of a species may change over the life of the plan. Plan components would continue to be implemented unless it is determined that a site-specific or plan amendment is needed.

The following sections provide additional plan components that focus on diversity and habitat needs for a variety of native plant and animal species. Refer to appendix C for potential management approaches and possible actions that may be used to contribute towards achieving plan direction. Refer to appendix D for more details on potential vegetation types. Refer to the glossary for definitions and information on the terminology used in these sections.

Plant species diversity (PLANT DIV)

Desired conditions (FW-DC-PLANT DIV)

- 01 Ecological conditions provide for plant species diversity, including plant species of conservation concern¹⁴, and ecological processes that sustain native plant communities are maintained or restored.

Guidelines (FW-GDL-PLANT DIV)

- 01 Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, retardant batch plants) for incident activities should not be located in areas of known plant species of conservation concern populations to avoid adverse impacts to these plants.
- 02 To avoid adverse impacts to plant species of conservation concern, heavy, ground-based equipment should not be used in areas with known plant species of conservation concern populations.

Threatened, endangered, proposed, or candidate plant species (PLANT)

Desired conditions (FW-DC-PLANT)

- 01 Habitat conditions support the recovery or long-term persistence of plant species listed as threatened or endangered under the Endangered Species Act, which currently include Spalding's catchfly (*Silene spaldingii*) and water howellia (*Howellia aquatilis*).
- 02 Vegetation conditions and ecological processes within a 300-foot riparian management zone surrounding ponds that provide *Howellia aquatilis* habitat (occupied and unoccupied) create a favorable physical environment that protects against hydrological changes that may adversely impact the species. The structural and floristic diversity of the vegetation in the riparian management zone is maintained.
- 03 Habitat conditions support the long-term persistence of whitebark pine (*Pinus albicaulis*), which is currently a candidate species under the Endangered Species Act. Ecological conditions and processes that sustain the habitats currently or potentially occupied by this species are retained or restored.
- 04 Whitebark pine trees or stands identified for collection of scion, pollen, or seed; areas identified as important for cone production; and whitebark pine plantations are protected from potential loss due to fire, insect, disease, or other threats to support the recovery or long-term persistence of this species.

Objectives (FW-OBJ-PLANT)

- 01 Treat 8,000 to 19,000 acres for the purpose of sustaining or restoring whitebark pine in the ecosystem and contributing to achieving desired conditions for the presence of this species across the landscape.

Guidelines (FW-GDL-PLANT)

- 01 Ground-disturbing vegetation treatments within 300 feet of ponds providing habitat for *Howellia aquatilis* should occur only if the vegetative, physical, and/or hydrological features required for

¹⁴ Species of conservation concern are identified by the Regional Forester; more information is available at <http://bit.ly/NorthernRegion-SCC>.

long-term habitat conservation are maintained or improved. Treatments should develop vegetation conditions consistent with natural ecological processes and should sustain soil quality and functioning to support the long-term persistence of *Howellia aquatilis*.

- 02** Road maintenance on roads within 300 feet of ponds providing habitat for *Howellia aquatilis* should maintain or improve hydrological integrity to protect habitat conditions for *Howellia aquatilis*.
- 03** To protect habitat conditions for *Howellia aquatilis*, water drafting (for invasive plant control or fire management activities) should not occur in occupied or unoccupied but suitable water howellia ponds.

Wildlife habitat diversity (WL DIV)

Desired conditions (FW-DC-WL DIV)

- 01** Ecological conditions provide for wildlife diversity (including species of conservation concern¹⁵) and wildlife habitat connectivity (including seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species). For desired conditions for select wildlife species, see table 14.

Table 14. Desired conditions for wildlife habitat diversity

Associated Species	Key ecosystem and/or ecosystem characteristic	Desired condition description
Bald eagle, great blue heron	40-acre or larger waterbodies or 4th order or larger streams	Bald eagles and great blue herons are not harassed or displaced from nesting due to human activities. Very large diameter trees (> 20 inches d.b.h., especially black cottonwoods) are available within 0.5 mile of rivers and 40-acre or larger waterbodies in order to provide nesting and roosting habitat. Fish are available to provide food.
Common loon	Lakes greater than 13 acres	Loons are not harassed or displaced from nesting due to human activities. Lakes and ponds with potential for nesting have shoreline or island sites with overhead cover. Small fish are available to provide food.
Boreal toad	Lakes, ponds, and wetlands	The ecological conditions of known boreal toad breeding lakes, ponds, and wetlands support boreal toad breeding, feeding, and metamorphosis. Known breeding sites are free of invasive species.
Northern bog lemming	Peatlands (including fens)	Areas in and within 300 feet of peatlands have low groundcover and downed woody material that contribute to northern bog lemming habitat and connectivity between clusters of individual sites.
Pika, hoary marmot	Boulder fields/talus	Accumulations of boulders and talus have adjacent areas of native forbs and grasses to provide habitat for pikas and hoary marmots.
Mountain goat	High-elevation cliffs (6,100 to 9,200 feet) on the Forest	Mountain goats are not harassed or displaced from known winter concentration areas or kidding areas due to human activities.

¹⁵ Species of conservation concern are identified by the Regional Forester; more information is available at <http://bit.ly/NorthernRegion-SCC>.

Associated Species	Key ecosystem and/or ecosystem characteristic	Desired condition description
Black-backed woodpecker and other birds	Forests burned with a mix of low, moderate, and high severity	Burned trees providing nesting and feeding habitat for black-backed woodpeckers and other birds are present in burned areas, primarily within wilderness, recommended wilderness, and inventoried roadless areas. In other management areas burned by moderate- to high-severity fire, there are clusters of recently burned trees, including some greater than or equal to 10 inches d.b.h. Burned forest areas have some trees that die gradually, providing habitat for up to a decade following wildfire.
Black swift	Waterfalls	Waterfalls with known nest sites for black swifts have water flow throughout the nesting season to provide nest site shading, or if this is not present, shading in front of potential nest sites provided by vegetation. Human disturbance levels do not disrupt nesting.
Clark's nutcracker	Whitebark pine forests in the cold potential vegetation type and Ponderosa pine forests in the warm-dry and warm moist potential vegetation types	Summer habitat: forests in the cold vegetation type contain live, seed-producing whitebark pine trees to provide food and nest sites for Clark's nutcrackers during the breeding season. Winter habitat: forests in the warm-dry and warm-moist types contain live, seed-producing ponderosa pine trees to provide food in winter.
Fisher	Forests in the warm-moist potential vegetation type including western larch, white pine, cedar, or hemlock and excluding mixed ponderosa pine/Douglas-fir forest and forests in riparian management zones	These forests provide the following habitat conditions for fisher: <ul style="list-style-type: none"> • old-growth forest (see glossary) with presence of very large snags, down logs, and live trees with heart rot for denning and resting, • old-growth forest (see glossary) arranged in connected, complex shapes with few isolated patches (especially in riparian management zones) to allow fishers to travel and to avoid predation, • a mosaic of diverse forest conditions (early to late stages of succession) providing habitat for species preyed upon by fisher, at a scale that provides a potential home range for fisher, • large mean patch size of old-growth forest at a scale that provides a potential home range for fisher.
Flammulated owl	Mixed ponderosa pine/Douglas-fir dominance types in the warm-dry and warm moist potential vegetation types	These forests provide the following habitat conditions for flammulated owls: <ul style="list-style-type: none"> • old-growth forest (see glossary) and mature forest with presence of large and very large snags to provide for nesting, • a mosaic of forest conditions that includes (1) areas with an open mid-story, (2) areas with dense Douglas-fir and ponderosa pine seedlings/saplings in the understory to provide roosting habitat, and (3) small openings to provide foraging habitat; at a scale that provides a cluster of potential home ranges for flammulated owls.

Associated Species	Key ecosystem and/or ecosystem characteristic	Desired condition description
Harlequin duck	Fast-moving, low-gradient (1-7%) streams and riparian management zones	<p>These streams used by harlequin ducks provide the following habitat conditions:</p> <ul style="list-style-type: none"> • high water quality and stream flows that support abundant aquatic invertebrates for feeding, • instream loafing sites (e.g., large rocks, gravel bars, concentrations of downed woody material), • dense shoreline cover (including live and dead trees, shrubs, and down logs) in nesting stream reaches to provide protection from terrestrial predators and protection from human disturbance, • natural stream barriers between known nesting stream reaches and downstream reaches to reduce competition for food and provide protection from instream predators, and • human disturbance levels do not disrupt nesting and brood rearing.
Townsend's big-eared bats and other bats	Caves, old mines, old buildings, and bridges and riparian management zones	<p>These habitats provide the following conditions:</p> <ul style="list-style-type: none"> • sites used as maternity roosts or hibernacula are accessible to bats, • sites used as maternity roosts or hibernacula are free of diseases that bats are susceptible to, and • human disturbance at sites used for maternity roosts or hibernacula does not preclude roosting or hibernation. <p>Riparian management zones provide the following habitat conditions:</p> <ul style="list-style-type: none"> • diverse structure (e.g., including shrubs and trees) to support nocturnal flying insects for food, and • snags and decaying trees to provide for roosting

- 02** Educational materials such as floating signs and shoreline signs provide information on how to avoid human disturbance to loons in nesting/nursery areas.

Objectives (FW-OBJ-WL DIV)

- 01** Install structures such as floating signs and nest platforms to promote successful common loon reproduction on three to ten occupied lakes annually, as needed.
- 02** Maintain or improve 100-1,000 acres of wildlife habitat.

Guidelines (FW-GDL-WL DIV)

- 01** Vegetation management activities should maintain, where present, an overstory canopy of full-crowned trees to provide snow intercept cover in key winter big game habitats, determined in cooperation with Montana Fish, Wildlife and Parks (MFWP). Since the amount of canopy needed varies on a site-specific basis according to factors such as tree species, aspect, or elevation, and changes over time, specific areas and prescriptions for management activities should be identified at the project level.
- 02** To reduce the risk of disturbance to nesting bald eagles in active nesting territories (as identified in the MFWP bald eagle nesting territory database), visual buffers within 0.25 mile surrounding active and alternate bald eagle nest sites should not be removed but may be enhanced.

- 03** If old buildings or bridges known to be used as bat roosts are removed, measures should be taken to mitigate the loss of bat habitat.
- 04** New projects or activity authorizations involving helicopter use should not occur within 1,650 yards of known mountain goat winter concentration or kidding areas (identified in cooperation with MFWP) from December 1 to July 15, unless they include strategies or design features to mitigate disturbance to mountain goats. Exceptions to this guideline may occur for public health and safety, emergency activities, or other approved administrative activities, such as site maintenance.
- 05** To reduce the risk of disturbance, new projects or new special-use authorizations for activities that are known to disrupt the select species listed in table 15 should not occur in key habitats during key time periods (see table 15) unless they include strategies designed to mitigate new disturbance. Exceptions to this guideline may occur for public health and safety or emergency activities.

Table 15. Key habitats and key time periods for select species

Species	Key Habitat	Key Time Period
Elk and Deer	Known winter concentration areas identified in cooperation with MFWP	December 1 to April 15 ¹
Gray Wolf	Within 0.25 mile of known, active den/rendezvous sites identified in cooperation with MFWP	April 1 to July 1
Bald Eagle	Within 0.25 mile of very large trees used as active nest sites identified in cooperation with MFWP (see also FW-GDL-WL DIV-02)	February 1 to August 15
Common Loon	Within 150 yards of active common loon nesting/nursery sites	April 1 to August 1
Peregrine Falcon	Within 0.5 mile of cliffs used as active nest sites identified in cooperation with MFWP	February 1 to August 15
Great Blue Heron	Within 0.2 mile of very large cottonwood trees used as active nesting rookeries identified in cooperation with MFWP	March 15 to August 1
Northern Goshawk	Within > 40-acre forest stands used as active nest sites identified in cooperation with MFWP	March 1 to August 15
Black Swift	Within 500 feet of active black swift nest sites	April 15 to August 15
Harlequin Duck	Active nesting stream reaches	April 15 to August 15

1. This does not apply in areas identified as suitable for motorized over-snow vehicle use (see figure B-11) during the designated open season.

- 06** If site-specific analysis determines that cover for one or more wildlife species is lacking in a project area, vegetation management activities should be designed and/or scheduled to retain cover between areas of forest where cover is lacking (e.g., recent large stand-replacement fire areas until succession creates new cover), if present. The intent is to avoid severing connectivity of cover.

Threatened, endangered, proposed, or candidate wildlife species (WL)

Desired conditions (FW-DC-WL)

- 01** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area; see figure B-10), bear attractants on NFS lands are stored in a manner that reduces the risk of grizzly bear-human conflicts in the NCDE.

- 02** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), grizzly bear habitat on NFS lands contributes to sustaining recovery of the grizzly bear population in the NCDE and contributes to connectivity with neighboring grizzly bear recovery zones.
- 03** The risk of grizzly bear-human conflicts is reduced by information, education, and design features or criteria for management activities.
- 04** If new threatened or endangered species are listed or their critical habitat is designated, key ecosystem characteristics and ecological conditions on NFS lands contribute to population recovery.
- 05** Within Canada lynx critical habitat mapped by the USFWS, boreal forest landscapes support a mosaic of differing forest successional stages, providing the physical or biological features essential to the conservation and recovery of the Canada lynx population.

Standards (FW-STD-WL)

- 01** Grizzly bear habitat on NFS lands in the NCDE shall be delineated and managed as the primary conservation area, zone 1 (including the Salish demographic connectivity area) (see figure B-10 or subsequent USFWS updates, if applicable).
- 02** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area; see figure B-10), food/wildlife attractant storage special order(s) shall apply to all NFS lands.
- 03** 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 non-denning 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 FW-STD-IFS-03.
- 04** The Northern Rockies Lynx Management Direction in appendix A, as modified by the Flathead National Forest’s forest plan record of decision, shall be applied.

Guidelines (FW-GDL-WL)

- 01** Within the NCDE primary conservation area, zone 1 (including the Salish demographic connectivity area), contractors, permittees, lessees, operators, and their employees should be informed of procedures for safely working and recreating in grizzly bear country and of food/wildlife attractant storage special order(s) prior to turn-out of livestock or beginning work and annually thereafter, in order to reduce the risk of grizzly bear-human conflicts.
- 02** Within the NCDE primary conservation area, zone 1 (including the Salish demographic connectivity area), if a contractor, permittee, lessee, operator, or their employee elects 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/attractant storage special order) should be provided before the campsite is established. The purpose is to reduce the risk of grizzly bear-human conflicts.
- 03** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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.

- 04 New projects or activity authorizations involving low-altitude helicopter flights or landings in areas of modeled wolverine maternal denning habitat (identified in cooperation with USFWS and the USFS Rocky Mountain Research Station) should not occur from February 15 to May 15 unless they include strategies or design features to mitigate disturbance to wolverines. Exceptions to this guideline may occur for public health and safety, emergency activities, or other approved administrative activities, such as site maintenance.

Pollinator species (POLL)

Desired conditions (FW-DC-POLL)

- 01 Ecological processes create vegetation conditions and patterns across the Forest that are consistent with the natural range of variation. These processes support plant communities composed of a diverse mix of native grass, forb, shrub, and tree species, providing foraging habitat for native pollinator species such as butterflies, bees, and hummingbirds.

Non-Native Invasive Plants/Noxious Weeds

Introduction

A species is considered to be 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 health, per Executive Order 13112.¹⁶ A noxious weed is defined by Montana Code Annotated 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.

The following desired conditions for non-native invasive plants and noxious weeds are complementary to other sections that address desired conditions for resilient forest and plant communities. Invasive plant management activities on the Forest are currently guided by the integrated pest management approach outlined in the environmental assessment and decision notice for noxious and invasive weed control.¹⁷ Refer to appendix C for additional information on approaches that may be used to manage weeds and contribute to achieving desired conditions.

Desired conditions (FW-DC-NNIP)

- 01 Native plant species and plant communities dominate the landscape, whereas invasive plant species are at low abundance or non-existent, especially in areas identified as high priority, including wilderness areas, native grassland plant communities, riparian areas (particularly those associated

¹⁶ USDA (1999), *Executive Order 13112 invasive species*, planning record exhibit # 00377.

¹⁷ USDA (2001b), *Decision notice, noxious and invasive weed control environmental assessment* (Kalispell, MT: USDA Forest Service, Region 1, Flathead National Forest), planning record exhibit # 00367.

with water howellia ponds), research natural areas (management area 4a), around known populations of plant species of conservation concern¹⁸, and in special areas (management area 3b).

- 02** No new non-native invasive plant species become established in terrestrial or aquatic plant communities on the Forest.
- 03** Terrestrial communities at risk of negative impacts from non-native invasive plants are able to retain or regain function, process, and structure after disturbance.
- 04** Invasive plant species are controlled with integrated pest management approaches in a strategic and adaptive manner. These approaches include an effective prevention and education program, combined with mechanical, biological, cultural, and chemical methods of weed control. Technological advances in weed treatments are capitalized on if they are shown to be equivalent to or more effective than existing treatments.

Objective (FW-OBJ-NNIP)

- 01** Treat 12,000 to 16,000 acres to contain or reduce non-native invasive plant density, infestation area, and/or occurrence. Greatest attention will be given to treating potential invaders or new invaders most likely to negatively impact native plant communities and ecosystem integrity, especially in areas identified as high priority (see FW-DC-NNIP-01).

Guidelines (FW-GDL-NNIP)

- 01** To reduce the probability of establishment of new non-native invasive plant populations, areas where soils are disturbed by management activities conducted or authorized by the USFS should be reseeded as soon as practical, during the appropriate time of year, using certified weed-free seed mixes.

Fire and Fuels Management

Introduction

Fire is a primary ecological process that has shaped and maintained forest and non-forest ecosystems that in turn sustain the native plant communities and animal species. Fire on the landscape occurs due to natural and planned ignitions. Wildland fires occur annually on the Forest, with natural ignitions occurring with summer thunderstorms typically from mid-July through mid-September. Wildland fires also occur due to human causes, most frequently campfires that are not adequately extinguished. The general public, as well as most large landowners, utilize fire to burn vegetation (both piled and broadcast) in the spring (March-June) and in the fall (September-November).

Fire managers strive to manage the natural role of fire while protecting values from adverse impacts of fire. 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 should focus on creating conditions in which fire can occur without devastating consequences.¹⁹ Treatments focus on restoring and

¹⁸ Species of conservation concern are identified by the Regional Forester; more information is available at <http://bit.ly/NorthernRegion-SCC>.

¹⁹ E. D. Reinhardt, R. E. Keane, R. E., D. E. Calkin, & J. D. Cohen (2008), Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States, *Forest Ecology and*

maintaining natural fire regimes and reducing the negative impacts of wildfires to watershed health, wildlife habitat, and community values at risk. Refer also to the Terrestrial Ecosystems and Vegetation section for plan components related to vegetation treatments; these also apply to fuel reduction treatments.

Desired conditions (FW-DC-FIRE)

- 01** Fire management activities minimize the risk of loss of life and damage to property or ecosystem function. Firefighter and public safety is the first priority in every fire management activity.
- 02** In areas where wildfires on NFS lands pose a threat to communities and community assets (e.g., power lines, communication towers, developed recreation sites, recreation residences, adjacent private land, and structures), wildland fuel is reduced so the expected fire behavior is reduced.
- 03** The full range of fire management activities, including wildland fires (prescribed fire and wildfire), are recognized and used by forest administrators as an integral part of achieving ecosystem sustainability, including interrelated ecological, economic, and social components such as improved ecosystem resilience and wildlife habitat, protection of property and other values at risk, and public safety.
- 04** Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meets desired conditions for other resources, including wilderness. Wildland fire is accepted as a necessary process integral to the sustainability of the Forest's fire-adapted ecosystems.
- 05** Fire management activities are designed to prevent spread of wildland fires to neighboring property where their objectives are inconsistent with wildland fire.
- 06** The Forest offers public information on wildfire risk to community leaders, service providers, business owners, homeowners, youth, and permittees related to the need to adapt their communities, properties, and structures to wildfire and recognize that wildland fire is an ecological process. The maintenance of defensible space, construction of fire-resistant buildings, and reduction of potential fire intensity around community assets to allow direct suppression tactics are examples of adapting to wildfire.
- 07** Fuelbreaks strategically located across the Forest are designed to result in less intense fire behavior and to facilitate safe wildland fire operations. Lower tree densities and fuel loadings occur within fuelbreaks and in some portions of the wildland-urban interface, compared to forest conditions that would normally develop through natural succession. These fuels conditions are maintained over the long term through active management.

Objectives (FW-OBJ-FIRE)

- 01** Move towards or maintain the desired conditions for fuel management by treatment (such as mechanical or prescribed fire) of forest vegetation on approximately 50,000 to 75,000 acres, utilizing all available management opportunities that contribute to reducing fire impacts to private property and NFS infrastructure, with an emphasis on the wildland-urban interface.

Management, 256(12), 1997-2006, doi:10.1016/j.foreco.2008.09.016, retrieved from <https://www.sierraforestlegacy.org/Resources/Community/CommunityProtection/FireScience/FireScience-Reinhardt-et-al2008.pdf>

Guidelines (FW-GDL-FIRE)

- 01** When designing fuels reduction projects, the Forest should work with partners and adjacent landowners as needed to identify areas and resources of value to improve effectiveness of fuel treatments.
- 02** Fire management activities should be designed to use wildfires forestwide to meet multiple resource management objectives where and when conditions permit, keeping risk within acceptable limits. Meeting resource objectives generally means progress towards or maintaining desired conditions.
- 03** Newly constructed fire lines should be located away from public access points to prevent their use as motorized travel routes.
- 04** If conducting vegetation management activities in the wildland-urban interface, hazard trees should be removed within two tree lengths of structures, private property, administrative sites, and fuel breaks to increase suppression effectiveness and provide for human safety.
- 05** To reduce the negative impacts of wildfires or improve fire control opportunities, treatments should be designed to remove or rearrange the material necessary to achieve at least one of the following outcomes: reduce flame length, rate of spread, or torching and crowning indices.
- 06** To protect private property and other values at risk, fire management strategies should be designed to suppress wildland fires that threaten neighboring property and resources when time, assets, and prevailing conditions allow for action without undue risk to responders.

Air Quality

Introduction

The Clean Air Act of 1970 and subsequent amendments give federal land managers the responsibility to protect air quality-related values in Class I and Class II areas and to protect human health and basic resource values in all areas. The Bob Marshall and Mission Mountains Wilderness are classified as Class I areas, which means that very little deterioration of air quality is allowed. Columbia Falls, Kalispell, and Whitefish, are the closest non-attainment areas, but virtually all land management activities on the Forest occur outside the non-attainment boundaries. The Flathead Indian Reservation and Glacier National Park are also Class I areas. Smoke (from wildfires and prescribed fires) and road dust have the greatest potential to affect air quality. The Forest designated the Great Bear Wilderness as Class II.

Desired conditions (FW-DC-AQ)

- 01** The Forest meets applicable Federal, State, and tribal air quality standards. Prescribed burning is planned to meet these standards, including in areas classified as class I areas (i.e., the Bob Marshall and Mission Mountains Wilderness) and class II areas (i.e., Great Bear Wilderness).
- 02** Air quality-related values of high-quality visual conditions and healthy breathable air are maintained within Class I and Class II areas.
- 03** Visibility, human health, quality of life, economic opportunities, high-quality recreation, and wilderness values are maintained by good air quality. Ambient air quality and visibility across the Forest are within Federal and State standards.

Human Uses, Benefits, and Designations of the Forest

Sustainable Recreation

Introduction

Developed and dispersed recreation encompasses a broad and diverse range of activities. On the Forest, there is a variety of recreation opportunities, including motorized and nonmotorized travel, horseback riding, hiking, hunting, fishing, camping, Nordic skiing, downhill skiing, snowmobiling, viewing natural features, driving for pleasure, mountain biking, floating and recreational boating, berry picking, and viewing wildlife.

Demographic and population studies show that visitation to the Forest and adjacent public land will continue to grow. The Flathead Valley and surrounding areas continue to experience high population growth and development. With the increasing numbers of recreationists, the Forest faces the task of managing the land in a way that offers a wide spectrum of opportunities while minimizing conflict between different uses and effects on the environment.

Suitability for motorized and nonmotorized recreation has been determined by management areas (see chapter 3). However, there may be routes and areas that are closed to public motorized use within management areas that are described as suitable for motorized use. Lands suitable for motorized over-snow vehicle recreation are displayed in figure B-11, and figure B-12 shows late-season routes and play areas. Suitability by management area was used as a factor, along with routes and terrain, in determining the recreation opportunity spectrum setting. Travel management decisions are separate, project-level decisions that determine the specific areas and routes for motorized recreation consistent with areas identified in the forest plan as suitable for motorized recreation use, along with the suite of forestwide desired conditions, standards, guidelines, and objectives. Just because an area is suitable for motorized use does not mean motorized use is allowable everywhere in that setting. Motorized use (by wheeled and/or over-snow vehicles) is restricted to designated trails, roads, and areas as shown on the motor vehicle use maps of the Flathead National Forest.

Summer recreation settings (SREC)

Introduction

The Forest's summer recreation opportunity spectrum settings range from primitive and unroaded backcountry areas that offer opportunities for solitude to roaded settings that connect communities to the Forest and offer visitors the opportunity to roam vast distances or gather and socialize with family and friends. Historic log cabins, ranger stations, and fire lookouts offer visitors a chance to learn about and experience the rich heritage of early Euro-American settlers. The social, managerial, and physical attributes of the Forest's recreation settings are managed to ensure these opportunities are available for future generations to enjoy.

Desired conditions (FW-DC-SREC)

- 01** Summer recreation settings provide a range of opportunities, as described by the recreation opportunity spectrum. The desired distribution of recreation opportunity spectrum settings is displayed in figure B-13 and summarized in table 16.

Table 16. Percentage of desired summer recreation opportunity spectrum settings on NFS lands

Summer recreation opportunity spectrum setting	Percent
Primitive	53%
Semiprimitive nonmotorized	16%
Semiprimitive motorized	2%
Roaded natural	29%
Rural	<1%
Urban	0%

- 02** Summer primitive recreation opportunity spectrum settings encompass large, wild, remote, and predominantly unmodified landscapes. These settings often coincide with designated and recommended wilderness and inventoried roadless areas. Additional primitive recreation opportunity spectrum settings are scattered across the Forest and are surrounded by semiprimitive nonmotorized settings. Primitive recreation opportunity spectrum settings contain no motorized recreation, and visitors have a low probability of seeing other people. Summer primitive settings provide opportunities for 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, when used, is constructed of rustic, native materials.
- 03** Summer semiprimitive nonmotorized recreation opportunity spectrum settings provide opportunities for exploration, challenge, and self-reliance. Rustic structures such as signs and footbridges 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. Closed roads may be present but do not detract from the semiprimitive nonmotorized experience of visitors.
- 04** Summer semiprimitive nonmotorized settings do not contain wheeled motorized recreation travel, but mechanized travel may be present.
- 05** Summer semiprimitive motorized recreation opportunity spectrum settings provide motorized recreation opportunities in backcountry settings. Routes are designed for off-highway vehicles 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 (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 off-highway vehicle 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 narrow corridors that function as portals for visitors to park their off-highway vehicles and explore adjacent semiprimitive nonmotorized and primitive settings on foot or bicycle.
- 06** The summer roaded natural recreation opportunity spectrum is managed as natural in appearance 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 passenger car 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

- 07** Summer rural recreation opportunity spectrum settings are high-use areas such as Whitefish Mountain Resort. These highly structured and hardened settings accommodate large group gatherings and serve as day-use destinations. Family reunions, weddings, and local special events often take place here. These settings also function as outdoor classrooms for interpretive programs and other structured learning. Roads and parking areas are generally paved, and structures and facilities provide shelter, sanitation, potable water, and other amenities.

Winter recreation settings (WREC)

Introduction

Recreation opportunity spectrum settings change as snow blankets the Forest's landscapes. Some settings become less accessible and more remote, but others change from nonmotorized to accommodating over-snow vehicles. Although the full range of settings, from primitive to rural, is still present, their location, distribution, and percentages change significantly during the winter months. Primitive and semiprimitive nonmotorized backcountry settings offer opportunities for solitude for those accessing the Forest on skis, snowshoes, or snowboards. Semiprimitive motorized settings cover large expanses of the Forest, offering over-snow-vehicle users the chance to explore many areas of the Forest that are nonmotorized in the summer months. Roaded natural and rural settings continue to serve as convenient connections to surrounding communities and provide easy access to visitors. Facilities are operated to provide user comfort. Groomed motorized and nonmotorized trails offer users the chance to get outside for a day trip or take longer, cross-country excursions. Rental cabins are available, although some require skiing in or an over-snow-vehicle trip to access them.

Desired conditions (FW-DC-WREC)

- 01** Winter recreation settings provide a range of opportunities as described by the recreation opportunity spectrum. The desired distribution of recreation opportunity spectrum settings is displayed in figures B-14 and summarized in table 17.

Table 17. Percentage of desired winter recreation opportunity spectrum classes on NFS lands

Winter recreation opportunity spectrum classification	Percentage
Primitive	53%
Semiprimitive nonmotorized	11%
Semiprimitive motorized	32%
Roaded natural	4%
Rural	< 1%
Urban	0%

- 02** Winter primitive recreation opportunity spectrum settings are large, remote, wild, and predominantly unmodified. Winter primitive recreation opportunity spectrum settings provide opportunities for 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 humans.
- 03** Winter semiprimitive nonmotorized recreation opportunity spectrum settings 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.

- 04** Winter semiprimitive motorized recreation opportunity spectrum settings provide backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked. There are vast areas to travel cross-country in designated areas, offering visitors an opportunity for exploration and challenge. Occasionally, historic rental cabins are available for overnight use and warming huts are available for short breaks.
- 05** Winter roaded natural recreation opportunity spectrum settings support higher concentrations of use, and levels of 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, semiprimitive nonmotorized, semiprimitive motorized). Guided motorized over-snow vehicle use, dog sledding, skiing, and snowshoeing may also be present.
- 06** Winter rural recreation opportunity spectrum settings include high-use ski areas such as Blacktail Mountain and Whitefish Mountain Resort. These areas are accessed from paved and plowed roads and are generally close to population centers. User comfort facilities such as toilets, restaurants, heated shelter facilities, and information and education are commonly present. Parking areas are large and plowed. Entry points and routes are signed and direct over-snow vehicles to adjacent roaded natural and semiprimitive motorized settings. Nonmotorized trails are also typically groomed for Nordic skiing. Rural winter settings provide access for communities and families to celebrate holidays, participate in racing events, and enjoy recreational skiing.

Sustainable recreation—General (REC)

Desired conditions (FW-DC-REC)

- 01** Within the NCDE primary conservation area, the number, capacity, and improvements of developed recreation sites (NCDE definition) provide for user comfort and safety while minimizing the risk of grizzly bear-human conflicts on NFS lands.
- 02** Within each bear management unit in the primary conservation area, increases in the number and capacity of developed recreation sites (NCDE definition) on NFS lands that are designed and managed for overnight use during the non-denning season are at levels that contribute to sustaining the recovery of the grizzly bear population in the NCDE.
- 03** The development scale of recreation facilities is consistent with the desired recreation opportunity spectrum settings and with river management and trail management plans.
- 04** Recreation facilities, including toilets, cabins, developed campgrounds, and visitor centers, are maintained to standard to protect Forest resources, provide safe access, and provide visitor experiences commensurate with the recreation opportunity spectrum setting. Visitors are very satisfied with the facilities and services on the Forest.
- 05** Recreation facilities and programs incorporate universal design concepts and meet current Federal accessibility guidelines.
- 06** Bear-human conflicts are minimized through proper food and garbage storage; food and garbage is unavailable to bears. Trailheads and Web-based information that reaches visitors prior to their arrival on the Forest provide education and information on recreating in bear country—especially activities that may cause sudden encounters with bears.
- 07** Livery services on the Forest are provided based on identified public need and protection of resource conditions and are compatible with other resources.

- 08 New and existing outfitter and guide services respond to public needs, facilitate safe access, and provide opportunities for visitors to connect with and learn about the cultural and natural resources of the area.
- 09 Opportunities for sustainable recreation are available for a wide variety of users and are offered across the four seasons of use.
- 10 Trailheads are strategically located to provide safe, convenient staging to adjacent backcountry settings throughout the year.
- 11 Recreation activities contribute to jobs and income in the local economy, community stability or growth, and the quality of life in the area.
- 12 There are sustainable dispersed recreation opportunities across the Forest. Dispersed recreation opportunities are compatible with the desired recreation opportunity spectrum setting and are managed to reduce the risk of user conflicts and environmental impacts.
- 13 Sustainable recreation opportunities are responsive to changing conditions due to system stressors such as climate change and changing use patterns and demands.
- 14 There are sustainable developed recreation opportunities across the Forest. Developed recreation opportunities are compatible with the desired recreation opportunity spectrum setting, and facilities are clean and safe, provide for user comfort, and are managed to reduce the risk of user conflicts and environmental impacts.
- 15 Existing developed sites are sustainable, maintained, and updated to accommodate current and anticipated recreation needs. New developed recreation sites are constructed to accommodate anticipated recreation demand, where compatible with other resources.
- 16 New and existing special-use permits serve the public interest, meet national standards, and complement the recreation settings and opportunities. Recreation special uses are used as a tool to provide desired recreation opportunities and are compatible with the recreation opportunity spectrum setting(s) in which they are permitted.
- 17 Outfitters and guides on the Forest provide high-quality public service, ensure public health and safety, protect natural resources, avoid degradation of the social setting, and minimize conflict with other users.
- 18 The Forest provides recreational cabin rentals that are clean, safe, and compatible with other resources.
- 19 Developed trailheads and river access sites provide appropriate access, parking, and sanitation management for the type of recreational use and respond to changing use patterns and demands.
- 20 Groomed motorized over-snow vehicle routes are provided that are consistent with the desired winter recreation opportunity spectrum settings, where compatible with other resources.
- 21 Groomed nonmotorized winter trail systems accommodate existing and anticipated demand and are consistent with the desired winter recreation opportunity spectrum setting and suitability determinations, where compatible with other resources.
- 22 The amount and distribution of motorized over-snow vehicle use does not have demonstrated adverse effects to maternal denning of wolverines or female grizzly bears with cubs during the den emergence time period.

- 23 The Forest provides sufficient law enforcement presence to educate and assist the public and administer Forest rules and regulations.
- 24 Forest vegetation conditions at developed recreation sites contribute to achieving the desired scenic integrity objectives, provide for healthy and resilient vegetation, and provide for screening between camping sites.
- 25 Commercial outfitted river operations provide guided fishing and boating experiences.
- 26 Access to the Forest's recreation settings and opportunities facilitates participation by diverse populations, and helps foster a sense of place and stewardship advocacy.

Objectives (FW-OBJ-REC)

- 01 Rehabilitate eight to ten dispersed recreation sites on the Forest with erosion or sanitation issues or other adverse effects on natural resources.
- 02 Provide bear-resistant food storage devices at developed campgrounds.
- 03 Improve seven to twelve developed campgrounds. See GA-OBJ for specific numbers by geographic area.
- 04 Add two to six recreational cabin rentals to the National Reservation System.
- 05 Within five years, expand communications about recreation and educational opportunities through social media, Websites, print- and web-based materials, webinars, and video technology.

Standards (FW-STD-REC)

- 01 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 non-denning season (e.g., campgrounds, cabin rentals, huts, guest lodges, recreation residences) shall be limited to one increase above the baseline (see glossary) in 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 pull-out to allow trailers to turn around safely); or
 - the agency operates a developed recreation site to allow overnight use only during the denning season (see glossary).
 - 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. Note: 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 pull-outs; trailheads, picnic areas, or boat launches that are closed at night; ski areas that do not have overnight lodging).

- 02** 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.
- 03** New motorized routes or areas available to the public shall not be designated in primitive or semiprimitive nonmotorized desired recreation opportunity spectrum settings (winter and summer).
- 04** Within the NCDE primary conservation area, new or reauthorized permits for ski areas on NFS lands that operate during the non-denning season shall include measures to limit the risk of grizzly bear-human conflicts (e.g., a requirement to store garbage in a bear-resistant manner).
- 05** Within grizzly bear denning habitat modeled by MFWP in the NCDE primary conservation area, there shall be no net increase in 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).

Guidelines (FW-GDL-REC)

- 01** 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 project 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.
- 02** To protect resources, new solid and sanitary waste facilities should be located outside of the inner riparian management zone.
- 03** To provide ecological conditions to support Canada lynx on NFS lands at a forestwide scale, there should be no net increase in miles of designated routes for motorized over-snow vehicle use, groomed routes, or areas where motorized over-snow vehicle use is identified as suitable. The “no net increase” is in comparison to the suitability displayed in figure B-11.

This guideline 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 (see appendix A).

- 04** To limit the risk of cumulative impacts to female wolverines with dependent young, there should be no net increase in percentage of modeled wolverine maternal denning habitat where motorized

over-snow vehicle use is identified as suitable on NFS lands at a forestwide scale. Specific locations of routes or areas suitable for motorized over-snow vehicle use are specified in figure B-11.

- 05 To reduce the risk of conflicts between wildlife and event participants as well as with other recreationists, authorizations for recreation events, group use, and commercial activities (see glossary) 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 reduction of wildlife-human conflicts.
- 06 To protect fishery resources and riparian-associated plant and animal species, new developed recreation sites should not be located within the inner riparian management zone except when they are related to health and safety or water, such as boat ramps and fish platforms. Structures should be developed with a Forest aquatics specialist so that fisheries and riparian-associated plant and animal species are protected.

Hunting, Trapping, Fishing, and Wildlife Viewing

Desired conditions (FW-DC-REC WL)

- 01 Habitat diversity supports species of interest for hunting (e.g., elk, deer, moose, mountain goat, bear, wolf), trapping (e.g., marten, wolf), and subsistence.
- 02 Habitat diversity supports species of interest for viewing (e.g., citizen science activities such as amphibian and raptor surveys, species identified as being of highest inventory need by MFWP).
- 03 Diverse opportunities exist for hunting, trapping, wildlife viewing, and fishing on Forest lands. Examples include assisted outfitted/guided and unassisted motorized and nonmotorized opportunities.
- 04 Levels and types of access for hunting, trapping, and fishing contribute to social and economic sustainability.

Scenery

Introduction

The Forest's scenery contributes to the identity and sense of place of local communities by serving as the backdrop and backyard for residents. The Forest's scenery is a significant attraction to visitors. The magnificent mountain vistas, meandering rivers, and forested settings are featured by state and local marketing efforts and contribute to the economic sustainability of communities.

Desired conditions (FW-DC-SCN)

- 01 The Forest's scenery reflects healthy resilient landscapes and exhibits attributes of the scenic character descriptions (see appendix F). Mountain silhouettes, meandering rivers, and vast expanses of natural-appearing forests enhance the quality of life for residents and visitors.
- 02 The Forest's scenery provides a range of scenic quality as described by the scenic integrity objectives. The desired distribution of scenic integrity objectives is displayed in figure B-15.

- 03 The rich heritage of the area is apparent—historic cabins and fire lookouts dot the landscape, adding to the unique scenic character of the area. More modern facilities reflect the architectural character of the area and utilize materials that blend with the natural settings.

Guidelines (FW-GDL-SCN)

- 01 To ensure consistency with the desired scenic character of the Forest and with the historical and cultural influences of the broader area, the construction or reconstruction of Forest Service facilities (recreation, fire, administrative, and other) and permitted facilities should be consistent with the Built Environment Image Guide.²⁰
- 02 To be consistent with the Forest's scenic integrity objectives, deviations that are visible in some areas of the Forest should generally be subordinate to the surrounding landscape and should diminish over time.
- 03 To maintain the Forest's scenic character (see appendix F), vegetation management activities should be designed to reflect natural disturbance regimes and processes to meet or exceed the scenic integrity objective.
- 04 To maintain the Forest's scenic character (see appendix F), infrastructure such as communication towers or recreation facilities should be designed to meet or exceed the scenic integrity objective.

Infrastructure

Introduction

The Forest's infrastructure (i.e., roads, trails, airstrips, and facilities) includes approximately 1,430 miles of open roads, approximately 2,260 miles of system trails, and four airstrips constructed to support Forest management activities such as fire suppression, timber harvesting, and recreation.

Desired conditions (FW-DC-IFS)

- 01 Within the NCDE primary conservation area, motorized access provides for multiple uses (such as harvesting of timber and non-timber forest products; hunting, fishing, and recreation opportunities) on NFS lands and also provides 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.
- 02 Motor vehicle use designations are complete and motorized vehicle use maps are available.
- 03 Community involvement and user awareness programs (educational and informational) reduce the risk of user conflicts on roads and trails and enhance the recreational experience.
- 04 Loop opportunities are a part of both the road and trail systems.
- 05 Public access is provided to NFS lands; a cooperative road system provides access to NFS and interspersed private and state lands.

²⁰ USDA (2001), *The built environment image guide for the national forests and grasslands*, Washington, DC: USDA Forest Service, retrieved from https://www.fs.fed.us/recreation/programs/beig/01_frontmatter.pdf.

- 06 A sustainable transportation system serves land management and public needs and purposes. It is interconnected with Federal, State, tribal, county, city, and private public roads and trails to provide access to lands, infrastructure, and inholdings where appropriate.
- 07 Road management objectives and trail management objectives are identified and current for roads and trails. Roads and trails are maintained in accordance with road and trail management objectives. The application of best management practices and other design features minimizes sediment input to waterbodies.
- 08 The Forest's trail system provides a variety of high-quality motorized and nonmotorized recreational opportunities during summer and winter. Forest system trails access destinations, provide for loop opportunities that connect to larger trail systems, provide linkages from local communities to the Forest, and are compatible with other resources.
- 09 Forest system trails are sustainably designed and managed to provide a variety of high-quality motorized and nonmotorized summer and winter public access that connects people to nature. Trails are maintained in accordance with trail management objectives direction
- 10 Trails are in the appropriate trail class for existing use levels and use types.
- 11 A sustainable trail system meets current and anticipated demands while protecting natural and cultural resources.
- 12 Road closure devices are maintained so that they are effective.
- 13 Existing airstrips on NFS lands (Condon, Meadow Creek, Spotted Bear, Schafer Meadows) are maintained to provide for quality recreational opportunities and administrative needs.

Objectives (FW-OBJ-IFS)

- 01 Decommission or place into intermittent stored service 30 to 60 miles of roads.²¹ Priorities are roads causing resource damage in priority watersheds and/or roads located within desired nonmotorized recreation opportunity spectrum settings and/or roads within bull trout watersheds.
- 02 Complete 100 to 300 miles of reconstruction or road improvement projects within desired roaded recreation opportunity spectrum settings.
- 03 Annually, maintain up to 1,000 miles of operational maintenance level 2 through 5 roads (see glossary).
- 04 Maintain up to 2,260 miles of NFS trails.
- 05 Reduce deferred trail maintenance backlog by 10-25 percent.
- 06 Annually, reconstruct 25 to 30 miles of trail.

Standards (FW-STD-IFS)

- 01 Within the NCDE primary conservation area, motorized use of roads with public restrictions shall be permitted for administrative use (see glossary), as long as it does not exceed either six trips

²¹ USDA (2014), Travel analysis report for Flathead National Forest (Kalispell, MT: USDA Forest Service, Flathead National Forest), planning record exhibit # 00413.

(three round trips) per week *or* one 30-day unlimited use period during the non-denning season (see glossary).

The exception to this standard is:

- emergency situations as defined by 36 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).

- 02** 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 open motorized route density or total motorized route density on National Forest System lands during the non-denning 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” definition in the glossary and FW-STD-IFS-03);
- 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;
- updated/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 (e.g., to the nearest intersection or turnout) to a better location to allow turn-arounds providing for public safety, to reduce vandalism, or to improve enforcement of the road closure;
- the agency exchanges, acquires, buys, or sells lands;
- a change in a motorized route is necessary to comply with Federal laws (e.g., Federal Rehabilitation Act);
- a change in a motorized route is necessary to address grizzly bear-human conflicts, human safety concerns, or resource damage/concerns (e.g., a road paralleling a stream may be decommissioned and replaced by a new upslope road to reduce water quality impacts);
- a change is made by an adjacent landowner that decreases secure core or increases motorized route densities on a particular national forest;
- emergency situations as defined by 36 CFR § 218.21; and
- temporary roads (see glossary).

- 03** 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 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 numbers shall not exceed the following limits per bear management subunit:

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

Exceptions to this standard include

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

Refer to appendix C for an example of how to calculate and apply the running average and temporary increase/decrease.

- 04** 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 non-denning 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).
- 05** During dust abatement applications on roads, chemicals shall not be applied directly to watercourses, waterbodies (e.g., ponds, lakes), or wetlands.
- 06** For new road construction and reconstruction of existing road segments within or adjacent to riparian management zones, side-casting of fill material shall not occur.
- 07** 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.

Guidelines (FW-GDL-IFS)

- 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 of grizzly bears being disturbed or displaced. Exceptions may be made where necessary to accommodate, for example,
 - 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.

- 02** Within the NCDE primary conservation area, levels of 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 one year after completion of the project in order to reduce the duration of grizzly bear displacement or disturbance due to project-related activities. Exceptions may be made where necessary to accommodate, for example,

- 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 one-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.

- 03** Roads, skid trails, temporary roads, and trails should have water drainage systems that possess minimal hydrological connectivity to waterbodies (except at designated stream crossings) to maintain the hydrologic integrity of watersheds and protect them from the delivery of water, sediment, and pollutants.
- 04** To reduce the risk to aquatic resources when decommissioning roads, making roads impassable, or storing roads, roads should be left in a hydrologically stable condition. For example, drainage off roads should be routed away from resources and landslide prone areas and towards stable areas of the forest floor to provide filtering and infiltration.
- 05** Prior to placing physical barriers such as berms on travel routes (e.g., roads, skid trails, temporary roads, or trails), the Forest should ensure that road drainage features are in place to protect aquatic and other resources.
- 06** 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 features²² should not be located on lands with high mass wasting potential.
- 07** To maintain free-flowing streams, new, replacement, and reconstructed stream crossing sites (culverts, bridges, and other stream crossings) should be designed to prevent diversion of stream flow out of the channel in the event the crossing is plugged or has a flow greater than the crossing was designed for.
- 08** When constructing or reconstructing trail and road fords, measures to harden the streambed, banks, and approaches for new trail and road fords should be included in the project design in order to maintain channel stability and reduce sediment delivery to watercourses.

²² Linear features include powerline rights-of-way and utility corridors.

- 09 To protect water quality, maintenance activities such as road blading and snowplowing on existing roads should not side-cast into or adjacent to waterbodies. When plowing snow, breaks should be designed in the snow berms to direct water off the road.
- 10 When constructing or reconstructing roads, drainage should be routed away from potentially unstable channels, fills, and hillslopes to reduce sediment delivery into streams.
- 11 To provide safe and functioning airstrips, management and maintenance of airstrips should follow Federal Aviation Administration recommendations.
- 12 Within areas specifically identified as being important for wildlife connectivity across highways (see table 18), the Forest should cooperate with highway managers and other landowners to design approaches and crossings that contribute to wildlife and public safety.

Table 18. Key highway crossing areas for wildlife

Area	Route	Mile Marker
east of Essex ¹	U.S. 2	181-184
east of Essex ¹	U.S. 2	189-190
east of Columbia Falls ¹	U.S. 2	141-143
north of Columbia Falls ¹	Rt. 486	7-9
between Whitefish and Eureka ¹	U.S. 93	148
between Whitefish and Eureka ¹	U.S. 93	157-160
Swan Valley ^{2, 3, 4}	U.S. 83	31-36
Swan Valley ^{2, 3, 4}	U.S. 83	45-58

1. Based on R. Ament, P. McGowen, M. McClure, A. Rutherford, C. Ellis, & J. Grebenc (2014), *Highway mitigation for wildlife in northwest Montana*, Bozeman, MT: Sonoran Institute, Northern Rockies Office, retrieved from <http://largelandscapes.org/media/publications/Highway-Mitigation-Wildlife-NW-Montana.pdf>.

2. Based on M. P. Huijser, K. E. Gunson, & C. Abrams (2006), *Animal-vehicle collisions and habitat connectivity along Montana Highway 83 in the Seeley-Swan Valley, Montana: A reconnaissance*, Western Transportation Institute, retrieved from <http://www.mdt.mt.gov/research/projects/env/seeley.shtml>.

3. Based on P. L. Sandstrom (1996), *Identification of potential linkage zones for grizzly bears in the Swan-Clearwater valley using GIS* (MS thesis), University of Montana, Missoula, retrieved from <http://scholarworks.umt.edu/etd/>.

4. Based on J. L. Weaver (2014), *Conservation legacy on a flagship forest: Wildlife and wildlands on the Flathead National Forest, Montana*, Bozeman, MT: Wildlife Conservation Society, retrieved from http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjI5LmQ19nKAhUK6mMKHeRNC38QFggcMAA&url=http%3A%2F%2Fwww.wcsnorthamerica.org%2FAdmin-Plus%2FDocstore%2FCommand%2FCore_Download%2FEntryId%2F28194.aspx&usq=AFQjCNFbCN6XJst6iW_LSda_zKBLU1O8g&bvm=bv.113034660.d.cGc.

- 13 To maintain and protect natural hydrologic flow paths, the transportation infrastructure should not alter stream courses. For example, streams should have crossing structures and not be routed down ditches.
- 14 To provide and maintain native aquatic organisms 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 are created or maintained to prevent spread or invasion of non-native species in alignment with fish and wildlife management agencies.
- 15 When designing, constructing, or reconstructing system trails, information on how to avoid and respond to bear-human encounters should be posted at trailheads. In addition, site-specific trail design should include one or more methods to limit the risk of bear-human conflicts such as, but not limited to,

- locating trails outside of riparian management zones or avalanche chutes unless it is necessary to cross or to access an existing developed recreation site, and
 - designing and/or maintaining trails to increase sight distance and/or to address speed of travel consistent with site-specific conditions for the managed use of the trail.
- 16** To protect fisheries resources and riparian-associated resource conditions and to maintain quality and quantity of water flows to, within, or between groundwater-dependent ecosystems, groundwater use developments (e.g., drinking water wells, wastewater facilities) should not:
- be developed in riparian management zones (unless no alternatives exist);
 - measurably lower river flows, lake levels, or flows to wetlands or springs (e.g., change springs from perennial to intermittent or eliminate springs altogether); and/or
 - discharge pollutants directly to groundwater.

Lands and Special Uses

Introduction

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

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

Desired conditions (FW-DC-LSU)

- 01** Land ownership adjustments, through purchase, donation, exchange, or other authority, improve national forest management by consolidating ownership, reducing wildlife-human conflicts, providing for wildlife habitat connectivity, improving public access to public lands, and retaining or acquiring key lands for wildlife and fish and within wild and scenic river corridors.
- 02** Existing road and trail easements that allow access to and/or across NFS land are maintained and additional easements are acquired as necessary.
- 03** Utility corridors and designated communications sites (see table 19) use existing facilities, sites, and corridors unless new sites can provide better social, economic, and ecological benefits.

Table 19. Designated communications sites and designated purpose

Designated communications site name	Designated purpose
Big Mountain	Broadcast and non-broadcast
Blacktail Mountain	Broadcast and non-broadcast
Cyclone Peak	Government entities only; non-broadcast
Desert Mountain	Broadcast and non-broadcast
Middle Fork Corridor	Non-broadcast
Mount Aeneas	Broadcast

- 04 Utility corridors and designated communications sites (see table 19) are sized to fit the intended use and obsolete or unused facilities are not present on the landscape.
- 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.
- 06 Conservation easements are managed to standard. Opportunities are explored for purchasing additional easements to maintain and protect wild and scenic river values and fish or wildlife habitat.
- 07 Occupancy trespass on NFS lands does not exist.
- 08 Special-use authorizations meet Forest management and public needs and are consistent with the desired recreation opportunity spectrum.

Guidelines (FW-GDL-LSU)

- 01 Special use authorizations in the primary conservation area should have permit requirements to help reduce or limit the risk of grizzly bear-human conflicts.
- 02 To maintain or improve habitat conditions for fish, water, and other riparian associated species and resources, authorizations for new special-use permits should include requirements for best management practices and at the conclusion of the permit should restore in-stream and riparian conditions if necessary.
- 03 To protect riparian and aquatic habitat, new support facilities should be located outside of riparian management zones. Support facilities include any facilities or improvements (e.g., workshops, housing, switchyards, staging areas, transmission lines) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation, or enhancement measures. At time of permit reissuance, the removal of such support facilities, where practical, should be considered.

National Scenic Trails

Background

Congressionally designated national trails are a network of scenic, and historic trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs, promote the enjoyment, appreciation, and preservation of open-air, outdoor areas, and historic resources and encourage public access and citizen involvement. These trails are generally single-track linear features that pass through a great variety of physical features, ranging from natural-appearing settings to locations where developments are noticeable. The Forest has two national scenic trails: the Continental Divide National Scenic Trail, which has approximately 18 miles on the Forest (all within designated wilderness), and the Pacific Northwest National Scenic Trail, which has approximately 28 miles on the Forest. Management of the Continental Divide National Scenic Trail is outlined in *The 2009 Continental Divide National Scenic Trail Comprehensive Plan*.²³ Refer to figures B-16 and B-17 for maps of these trails. The corridor width is 1 mile for both trails.

²³ USDA (2009), *The 2009 Continental Divide National Scenic Trail comprehensive plan*, USDA Forest Service, retrieved from https://www.fs.fed.us/cdt/main/cdnst_comprehensive_plan_final_092809.pdf.

Desired conditions (FW-DC-NST)

- 01** National scenic trails outside wilderness are clearly marked and identified for users with the national recreation or scenic trail symbol, especially at the trail termini and junctions with side trails. Access to the trail and travel on the trail are preserved and the resources along the trail are interpreted in a manner that does not impair the feature(s) for which the individual trail was established.
- 02** The Pacific Northwest National Scenic Trail segment on the Forest provides a nonmotorized long-distance trail.
- 03** The Pacific Northwest National Scenic Trail and the Continental Divide Scenic Trail provide outstanding scenery as well as conservation of the nationally significant scenic, historic, natural, and cultural qualities of the areas it passes through. Users have opportunities for inspiration, challenge, and solitude as well as kinship with other trail users and interactions with people past and present who have shaped these places along the trail.
- 04** The Continental Divide National Scenic Trail provides high-quality scenic, primitive hiking, and horseback-riding opportunities.

Standards (FW-STD-NST)

- 01** No surface occupancy for oil and gas leasing activities and no common variety mineral extraction shall occur within the national scenic trail corridor. Refer to figure B-16 for a map of the Pacific Northwest National Scenic Trail corridor.

Guidelines (FW-GDL-NST)

- 01** To maintain the outstanding features of the Continental Divide National Scenic Trail and the Pacific Northwest National Scenic Trail and be compatible with the surrounding environment, trail-related facilities and facilities within the corridor should blend in with the surrounding environment. Where the trail leads to an outstanding destination feature, the qualities of that feature should be preserved.
- 02** To maintain and protect the scenic qualities of the Continental Divide National Scenic Trail and the Pacific Northwest National Scenic Trail, management activities should be consistent with the scenic integrity objective of high to very high.

Production of Natural Resources

Forest Vegetation Products: Timber

Introduction

The planning rule requires identification of lands that are suited and not suited for timber production based on several factors that include legal withdrawal (e.g., timber production prohibited due to a statute or executive order), technical factors (non-forested lands, geology or soil conditions, etc.), and compatibility with desired conditions and objectives stated in the plan (forestwide or management area plan components). Table 20 displays the timber production suitability classification for the forest plan. Refer to appendix C for additional information on timber suitability.

Table 20. Timber production suitability classification

Land Classification Category	Acres
A. Total NFS lands in the plan area	2,392,800
B. Lands not suited for timber production due to legal or technical reasons	1,655,400
C. Lands that may be suited for timber production (A – B)	737,400
D. Total lands suited for timber production because timber production is compatible with the desired conditions and objectives established by the plan	465,200
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)	272,200
F. Total lands not suited for timber production (B + E)	1,927,600

Note. Acres are from GIS dataset and analyses, rounded to the nearest 100 acres. The official acres for NFS lands can be found in the land area report (USDA (2015), Land areas of the National Forest System (LAR), USDA Forest Service, Lands and Realty Management, retrieved from <https://www.fs.fed.us/land/staff/lar-index.shtml>).

Timber harvest is allowed on some lands not suitable for timber production for such purposes as salvage, fuels management, insect and disease mitigation, protection or enhancement of biodiversity or wildlife habitat, research or administrative studies, or recreation and management of scenic resources. Suitability for timber harvest is determined by management area, geographic area, and forestwide by resource (i.e., riparian management zones). There are approximately 429,300 acres not suitable for timber production where timber harvest is allowed.

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 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, section 11; 16 USC 1611; 36 CFR § 219.11(d)(6)). It is the volume that could be produced in perpetuity on lands that may be suitable for timber production. 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. The sustained yield limit calculated for the Flathead National Forest is 25.4 million cubic feet per year.

To clearly display the intended timber program, the plan identifies the projected wood sale quantity and the 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 plan period for any purpose (except salvage harvest or sanitation harvest) on all lands in the plan area. The projected timber sale quantity is the portion of the projected wood sale quantity that meets applicable

utilization standards. Both the projected wood sale quantity and the projected timber sale quantity are based on the fiscal capability and organizational capacity to achieve the desired conditions and objectives in the plan for the plan period. Fiscal capability and organizational capacity is based on current budget levels. The resulting projected wood sale quantity and projected timber sale quantity are found in objectives FW-OBJ-TIMB-01 and 02. These timber volume outputs are less than the sustained yield limit.

Desired conditions (FW-DC-TIMB)

- 01** Production of timber and timber harvest contributes to ecological sustainability and contributes to the achievement of vegetation desired conditions (such as species composition, size class, forest density, vegetation diversity, landscape pattern, and forest resilience to disturbances).
- 02** Production of timber and timber harvest contribute to economic sustainability, providing jobs and income to local economies. A mix of timber products (including both sawtimber and non-sawtimber) is offered under a variety of contract methods in response to market demand.
- 03** In areas suitable for timber production, timber harvest, thinning, and planting have a primary role in achieving the desired vegetation conditions.
- 04** Forest conditions on lands suitable for timber production are conducive to providing timber outputs at a sustainable level through a regularly scheduled timber harvest program. A variety of silvicultural practices are used to achieve desired conditions, including regeneration harvest, planting of trees, thinning, and fire (wildfire and prescribed fire).
- 05** In areas suitable for timber production, sanitation or salvage harvest may occur and contribute to the overall economic benefits of harvest while achieving desired conditions and management direction for other resources (e.g., wildlife habitat, snags) and providing for human safety along open roads and trails.
- 06** On lands identified as not suitable for timber production but where timber harvesting is allowed to achieve multiple-use values, timber harvest contributes to achieving desired conditions while providing economic and social services and benefits to people. Timber harvest on these lands occur to protect multiple-use values other than timber production, such as salvage, sanitation, public health, or safety.
- 07** Although natural disturbances (for example, wildfire, insects, and disease) occur on lands suitable for timber production, active management of these lands results in conditions that are resilient and/or resistant to such disturbances, with less potential loss of timber to natural disturbances compared to lands designated unsuitable for timber production.

Objectives (FW-OBJ-TIMB)

- 01** Annually, offer timber for sale at an average projected timber sale quantity of 27.3 million board feet (5.5 million cubic feet)²⁴.
- 02** Annually, offer commercial timber and other products for sale at an average annual projected wood sale quantity of 6.3 million cubic feet²⁴.

²⁴ Estimates of timber outputs may be larger or smaller on an annual basis, or over the life of the plan, if legal authorities, management efficiencies, or unanticipated constraints change in the future. Modeling of the projected timber sale quantity under an unlimited budget and consistent with all plan components resulted in an average annual volume output in the first decade of 38 million board feet (7.6 million cubic feet) (FEIS, section 3.21.2)

Standards (FW-STD-TIMB)

- 01** Timber shall not be harvested on lands where soil, slope, or other watershed conditions may be irreversibly damaged, as identified in project-specific findings.
- 02** Timber harvesting shall only be done when there is reasonable assurance of restocking within five years after final regeneration harvest. Restocking level is prescribed in a site-specific silvicultural prescription for a project treatment unit and is determined to be adequate depending on the objectives and desired conditions for the plan area. In some instances, such as when stands are treated to reduce fuel loadings, to create openings for scenic vistas, or to remove encroaching trees to meet desired vegetation or wildlife habitat conditions, it is acceptable not to restock or to restock at very low tree densities.
- 03** Silvicultural treatments shall not be selected based solely on their ability to provide the greatest dollar return.
- 04** Clearcutting shall be used as a harvest method only where it has been determined to be the optimum method, and other types of even-aged harvest shall be used only where determined to be appropriate. Determinations shall be based on site-specific conditions and the desired conditions for vegetation, wildlife habitat, scenery, and other resources.
- 05** The quantity of timber that may be sold per decade shall be less than or equal to the sustained yield limit of 25.4 million cubic feet per year, with the following exceptions: salvage or sanitation harvesting of timber stands that are substantially damaged by fire, windthrow, or other catastrophe or that are in imminent danger from insect or disease attack. In these situations, trees may be harvested over and above the sustained yield limit, consistent with the desired conditions for terrestrial and aquatic ecosystems.
- 06** Even-aged stands shall generally have reached or surpassed culmination of mean annual increment of growth prior to regeneration harvest unless at least one of the following conditions have been identified during project development:
 - Such harvesting would modify fire behavior to protect identified resource, social, or economic values.
 - Harvesting of stands will trend the landscape towards vegetation desired conditions.
 - Harvest uses uneven-aged silvicultural systems, thinning, or other intermediate stand treatments that do not regenerate even-aged or two-aged stands.
 - Harvest is for sanitation or salvage of timber stands that have been substantially damaged by fire, windthrow, or other catastrophe or that are in imminent danger from insect or disease attack.
 - 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 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 be 40 acres. This standard applies to newly created harvest openings on NFS lands only and need not consider existing recently created openings on NFS, adjacent private, or other agency lands.

Exceptions to the 40-acre maximum opening size standard may occur when determined necessary to help achieve desired ecological conditions for the plan area. These desired conditions include providing for forest patterns and patch sizes that are consistent with natural disturbance regimes (see FW-DC-TE&V-03, FW-DC-TE&V-18; FW-DC-TE&V-19, FW-DC-SCN-01), providing for

habitat that contributes to long-term persistence of native plant and animal species (see FW-DC-TE&V-04), maintenance of instream channel conditions (see FW-DC-WTR-04 and 08), and maintaining or creating forests resistant and resilient to future disturbances (see FW-DC-TIMB-01 and 07). Maximum opening size exceptions to the standard are displayed in table 21.

Table 21. Maximum opening size (acres) created by even-aged harvest in one harvest operation

Potential vegetation type	Maximum opening size
Warm-dry and warm-moist	80
Cool-moist	150
Cold	90

- 08** Harvest openings created as a result of one harvest operation that exceed the maximum opening size established in table 21 will require 60-day public review and regional forester approval.
- 09** FW-STD-TIMB-07 and 08 shall not apply to the size of harvest openings created as a result of catastrophic (stand-replacing or stand-initiating) natural disturbances such as fire, windstorms, or insect or disease infestations.

Guidelines (FW-GDL-TIMB)

- 01** If salvaging timber in areas burned by wildfire, unburned patches or patches burned with low severity (less than 20 percent mortality of trees) within the burn perimeter should be retained to contribute to wildlife habitat diversity.
- 02** If salvaging timber in areas burned by mixed or high-severity wildfire, clusters of burned trees with a variety of sizes should be retained to provide habitat for wildlife species associated with burned habitats.
- 03** If salvaging timber in areas with high-severity disturbance (e.g., fire, insect or disease epidemic) that were verified old-growth forest prior to the fire, standing (and down) live, dying, and dead western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. should be retained to contribute to diverse forest structure for wildlife, even if the forest stand no longer meets the old-growth forest definition. If these retained trees fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety, they should not be removed but should be left on the ground to contribute to large downed woody material.

Other Forest Products

Other forest products that occur on the Forest include, but are not limited to, huckleberries, mushrooms, firewood, fuelwood, post and poles, Christmas trees, tepee poles, and medicinal or botanical products.

Desired conditions (FW-DC-OFP)

- 01** Provide a variety of public services and special forest products (such as mushrooms, huckleberries, firewood) from NFS lands while minimizing the risk of grizzly bear-human conflicts on NFS lands in the NCDE.
- 02** When permitted, special forest and botanical products are collected in a sustainable manner, providing products for current and future generations.
- 03** Vegetation management activities augment the firewood program, providing opportunities for collecting firewood.

- 04** Berry-producing huckleberries are available for wildlife as well as human use and are collected in a sustainable manner. The public is aware of non-destructive berry-picking methods that preserve the huckleberry plant for future use.

Standards (FW-STD-OFP)

- 01** 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.

Guidelines (FW-GDL-OFP)

- 01** Prior to temporarily opening a road to provide public access for gathering firewood, measures should be taken to protect the most valuable snag(s) as habitat for wildlife (e.g., by placing “wildlife tree—no cutting” signs on selected snags).

Energy and Mineral Resources

Introduction

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

1. locatable minerals: includes commodities such as gold, silver, copper, zinc, nickel, lead, platinum, and some nonmetallic minerals such as asbestos, gypsum, and gemstones. Under the Mining Law of 1872, U.S. citizens are guaranteed the right to prospect and explore lands reserved from the public domain and open to mineral entry. The right of access for exploration and development of locatable minerals is guaranteed.
2. salable minerals: includes common varieties of sand, stone, gravel, cinders, clay, pumice, and pumicite. The Forest Service has the authority to dispose of these materials on public lands through a variety of methods. The disposal of these materials is discretionary.
3. leasable minerals: includes commodities such as oil, gas, coal, geothermal, potassium, sodium phosphates, oil shale, sulfur, and solid leasable minerals on acquired lands. Currently, there are 341 suspended oil and gas leases covering approximately 641,500 acres on the Forest. No activity can take place on the leases until an environmental impact statement is completed.

Desired conditions (FW-DC-E&M)

- 01** 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.
- 02** Locatable minerals are available for prospecting, exploring, developing, and producing, and the lands are reclaimed in an appropriate manner. Abandoned mines that present a physical or chemical hazard are identified, inventoried, and reclaimed in the appropriate manner, with priority given to those that pose a human health risk.
- 03** The lands developed for minerals materials are reclaimed in the appropriate manner.

- 04** Non-energy leasable minerals are available for prospecting, exploring, developing, and producing, and the lands are reclaimed in the appropriate manner.

Standards (FW-STD-E&M)

- 01** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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 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 agreement of the holder of the lease, permit, or plan of operation.
- 02** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), new or reauthorized permits, leases, and/or plans of operation shall include a clause providing for modification or temporary cessation of activities, if needed, to resolve a grizzly bear-human conflict situation.
- 03** 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.
- 04** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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 MFWP;
 - 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 all work camps.
- 05** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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, and 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 of mineral activity to grizzly bears.
- 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 management zones shall identify how reclamation will occur, plant species to be used in reclamation, a time frame of when reclamation will be completed, and monitoring criteria; and
- reclamation and revegetation of motorized routes, drilling pads, and other areas disturbed from mineral activities shall be completed as soon as practicable by the operator.

06 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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 and permits 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.

07 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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.

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

09 Mineral development shall not be allowed in areas withdrawn from mineral entry.

Guidelines (FW-GDL-E&M)

01 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), in addition to forestwide guidelines, the following guidelines apply to new leasable minerals activities including leases, surface use plans for proposed wells or operations, or 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;
 - 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.
- 02** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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.
- 03** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), along motorized routes, seismic corridors, and pipelines constructed for leasable energy activities, wildlife cover should be maintained at regular intervals, where available (this varies on a site-specific basis) in order to provide habitat connectivity for grizzly bears.
- 04** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), for locatable and non-energy leasable minerals activities with the potential to adversely affect the grizzly bear or its habitat, the following tiered measures should be used 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 the 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.
- 05** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), carrying bear spray should be recommended to mineral permittees, lessees, and operators to reduce the risk of grizzly bear-human conflicts.
- 06** Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), 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.
- 07** To protect water quality and inland native fish habitat, wildlife and other riparian-associated resources, mineral operations should not be authorized in riparian management zones. If the riparian management zone cannot be avoided, the authorization should include measures to maintain, protect, and rehabilitate fish and wildlife habitat that may be affected by the operations.

Livestock Grazing

Desired conditions (FW-DC-GR)

- 01 Within the NCDE primary conservation area, the number, capacity of, and improvements on livestock grazing allotments support ecologically sustainable grazing, and temporary grazing permits are used effectively for management of noxious weeds, while minimizing the risk of bear-human conflicts on NFS lands.
- 02 Existing cattle-grazing allotments help preserve the rural landscape and cultural heritage of the area while sustaining biological diversity and ecological processes.
- 03 Management of livestock grazing maintains the desired species composition, structure, and condition of plant communities. Regeneration of forests and biological diversity is not limited by livestock grazing. Forage, browse, and cover needs of wildlife and authorized livestock are in balance with available forage.
- 04 Transitory forage on forest lands is available for cattle grazing within existing, permitted allotments.
- 05 Dispersed grazing is available for use by pack stock.

Standards (FW-STD-GR)

- 01 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), new or reauthorized livestock grazing permits and annual operating plans shall incorporate requirements to reduce the risk of grizzly bear-human conflicts (e.g., 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.
- 02 Within the NCDE primary conservation area and zone 1, a sheep grazing permit in non-use status shall not be allowed to increase allowable animal unit months beyond what was previously permitted prior to being in non-use when it is returned to use. Note: The Flathead National Forest does not have any sheep allotments.
- 03 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), permits for livestock grazing shall include a provision that requires reporting 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.
- 04 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), there shall be no net increase in the number of active sheep allotments on NFS lands. Note: The Flathead National Forest does not have any sheep allotments.
- 05 Within the NCDE primary conservation area, there shall be no 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 that does not result in grazing allotments in currently unallotted lands.
- 06 Within the NCDE primary conservation area and zone 1 (including the Salish demographic connectivity area), temporary permits for grazing by small livestock for purposes such as

controlling invasive exotic weeds or reducing fire risk, or for trailing of small livestock across NFS lands, shall not result in an increase in bear-small livestock conflicts.

- 07** New or reauthorized livestock grazing permits shall incorporate requirements that reduce the risk of impacts to native fish or riparian habitat (e.g., through modifying accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.).
- 08** New livestock handling and/or management facilities must be located outside of riparian management zones. New areas for livestock trailing, bedding, watering, salting, loading, and other handling or management efforts shall be limited to those areas and times that would not adversely affect listed animal and plant species or animal and plant species of conservation concern.

Guidelines (FW-GDL-GR)

- 01** During allotment management planning, grazing practices (e.g., length of grazing season, stocking levels, timing of grazing) should be adjusted if needed to achieve desired conditions for riparian management zones (this varies on a site-specific basis).
- 02** Within the NCDE primary conservation area, an allotment management plan 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).
- 03** Livestock trailing, bedding, watering, salting, loading, and other handling activities should be avoided in riparian management zones.
- 04** To reduce bank trampling of perennial vegetation on or near the water's edge (i.e., the greenline):
 - do not exceed 20 percent streambank alteration;
 - do not exceed 40 percent utilization of mean annual vegetative production on woody vegetation; and
 - maintain at least 4-6 inches or do not exceed 40 percent utilization of mean annual vegetative production on herbaceous vegetation.

Social and Economic Environment

Social and Economic Systems

Desired conditions (FW-DC-S&E)

- 01 Ecological sustainability provides a variety of benefits that contribute to community stability and the quality of life in nearby communities and the larger population, such as clean water, forest products, livestock grazing, carbon sequestration, energy generation, recreational opportunities, aesthetics, cultural uses, and habitat for biodiversity in the Forest. Vegetation conditions support the long-term sustainability of these benefits to people by reducing the risk of undesirable fire effects, disease, and mortality, which may interrupt or eliminate Forest benefits.
- 02 Sustainable and predictable levels of goods and services (such as wilderness hunting and fishing opportunities, timber, downhill skiing, and huckleberries) are provided for local communities and contribute to the local economy through the generation of jobs and income while creating products for use both nationally and locally.
- 03 Opportunities connect people, including youth, with the natural and cultural resources across the Forest through recreation and/or employment opportunities.

Partnerships and Coordination

Desired conditions (FW-DC-P&C)

- 01 The Forest works towards an all-lands approach to management, cooperating with other land managers; this includes efforts to mitigate threats or stressors, provide for wildlife and fish habitat connectivity, and provide social, economic, and ecological conditions that contribute to mutual objectives.
- 02 The Forest cooperates and coordinates with State agencies, Federal agencies, tribes, counties, and other groups in ways that lead to a stable or an upward trend of native fish and wildlife species and desired non-native aquatic and terrestrial species.
- 03 Recovery of threatened and endangered species is accomplished through cooperation with USFWS (including section 7 consultation, as required), State agencies, other Federal agencies, tribes, counties, interested groups, and interested private landowners.
- 04 The Forest coordinates with MFWPs and USFWS in managing the wildlife resource within designated wilderness while protecting the wilderness character.
- 05 Partnerships with federal and nonfederal entities help achieve desired conditions and improve overall resources management. Partnerships and/or collaborative processes within local communities foster relationships that help accomplish projects in the communities' and Forest's shared interest.
- 06 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.

- 07 Ongoing government-to-government and staff consultation for each federally recognized tribe with historical or treaty interests in the Forest's NFS lands occurs through a cooperatively established tribal consultation protocol.
- 08 The Forest and potential partners have an expressed mutual interest in and understanding of a common purpose(s) that helps each achieve their respective missions.
- 09 Partnerships and projects are widely recognized by the public as beneficial to resource management and as an appropriate and efficient use of Forest Service cooperative efforts and funding.
- 10 Partnership arrangements are transparent to the public and free of real or apparent conflicts of interest or endorsement of commercial products, services, or entities.
- 11 The Forest partners with local groups to develop and maintain a trail system as well as trail infrastructure (e.g., a hut-to-hut system) where compatible with other resources.
- 12 The Forest partners with agencies, organizations, and support groups to maintain the Flathead National Forest Backcountry Administrative Facilities Historic District.
- 13 The Forest coordinates with scientists from Rocky Mountain Research Station on the effects of climate change.
- 14 Federal, State, county, and tribal agencies, universities, local schools, nongovernmental organizations, and private landowners have the opportunity to participate in cooperative partnerships to support a quality educational program and program delivery.
- 15 The Forest works towards an all-lands approach to management of species of conservation concern, cooperating with other land managers across the range of a species and including efforts to provide for habitat connectivity, mitigate threats or stressors, and provide other ecological conditions that support the species.
- 16 The bull trout population trends towards recovery through cooperation and coordination with USFWS, tribes, State agencies, other Federal agencies, and interested groups. Recovery is supported through the Bull Trout Conservation Strategy and the Bull Trout Recovery Plan.
- 17 Cooperation and coordination occurs with adjacent landowners to identify and manage non-native invasive weeds.
- 18 Partnerships are developed with various interest and user groups to participate in evaluation, planning, and maintenance programs for both roads and trails.
- 19 The U.S. Border Patrol has access to the U.S.-Canadian border and the infrastructure needed to protect it.
- 20 Partnerships are developed to help address management needs for wilderness and wild and scenic rivers.

Cultural Resources

Desired conditions (FW-DC-CR)

- 01 Cultural resources (e.g., buildings, sites, districts, structures, and objects) having scientific, cultural, or social values are preserved and protected for their cultural importance. Removal of a cultural resource may occur after site-specific review and consultation with the Montana State Historic Preservation Office and the appropriate tribe. Site integrity and stability is protected and maintained

on sites that are susceptible to imminent risks or threats or where the values are rare or unique. Heritage assets are stable and their significant values protected. Vandalism, looting, theft, and human-caused damage to heritage resources are rare. Site significance and integrity are maintained through conservation and preservation efforts and receive minimal impact from visitors.

- 02** Traditional cultural properties, cultural landscapes, sacred sites, and other culturally significant areas identified by tribes and local communities provide tangible links to historically rooted beliefs, customs, and practices. These resources are protected through consultation with tribes, traditional cultural practitioners, consulting parties, and project design.
- 03** Cultural resources provide educational opportunities that connect people, past and present, to the land and its history. 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 some cases, historic routes (e.g., railroad grades) are used for recreation trails with interpretation of their history and some historic features. Heritage-based recreation opportunities are connected, where practical, with other recreation opportunities such as trails.
- 04** Public enjoyment is enhanced by opportunities to visit interpretive cultural resource sites. Archaeological research contributes to knowledge about ancient American Indian history and provides a valuable perspective on past climate and environment. Archaeological site etiquette information is readily available to national forest visitors. Interpretation of the human history of the Forest promotes greater public understanding of the communities that have depended on this landscape for their livelihood, recreation, and spiritual well-being.
- 05** Opportunities exist for volunteers to participate in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation. Cultural resource programs, interpretive presentations, and/or publications are available to provide the public with opportunities to learn about, understand, and experience the Forest's past.
- 06** Sites identified as significant under the National Historic Preservation Act are inventoried, protected, and, if warranted, nominated to the National Register of Historic Places. Restored historic buildings placed on the Forest Service facility rental program add to forest recreation program capacity and diversity and generate revenue. Historic Forest Service administrative buildings are maintained to reflect agency history, identity, and function.

Objectives (FW-OBJ-CR)

- 01** Annually, complete an inventory of 50 to 100 acres containing, or predicted to contain, highly valuable, threatened, or vulnerable cultural resources (non-project acres).
- 02** Evaluate and nominate four to eight significant cultural resources to the National Register of Historic Places or develop five historic contexts, overviews, thematic studies, or cultural resources property preservation plans to help guide management and use of National Register eligible or listed properties, districts, traditional cultural properties, and cultural landscapes.
- 03** Annually, complete one public outreach or interpretive project that enhances public understanding and awareness of cultural resources and/or the history of the Forest.

Standard (FW-STD-CR)

- 01** To protect cultural resources, provisions shall be included in applicable contracts, agreements, and special-use permits for properties that are unevaluated, eligible for, or listed in the National Register of Historic Places.

Areas of Tribal Importance

Desired conditions (FW-DC-TRIB)

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

Objectives (FW-OBJ-TRIB)

- 01 The Forest manages traditional cultural properties through the development of two to five management plans, in consultation with the tribes.

Research and Education

Desired conditions (FW-DC-R&E)

- 01 Interpretation and education opportunities enrich visitors' experience and understanding of the Forest by providing, for example, information on wildlife-human conflicts and aquatic and terrestrial invasive species.
- 02 Conservation education, interpretive, and visitor information programs provide opportunities for visitors, youth, and communities to appreciate and understand the Forest's natural and cultural resources and learn how to conserve those resources for future generations.
- 03 Education, interpretive, and information programs and activities connect people to the Forest environment and foster a sense of place and stewardship.
- 04 Focused education activities engage youth in hands-on outdoor experiences and support educators teaching science and natural resource topics.
- 05 Diverse methods and media are used for program delivery, including making best use of new technologies such as social media, Web/Internet presence, self-guided media using smartphones, and other devices to help maintain relevancy for the audience.
- 06 Research continues to provide information and guide management related to ecological, social, and economic conditions across the landscape.

Chapter 3. Management Area Direction

Introduction

The NFS land within the Forest boundary has been divided into seven broad management areas and further subdivided into 16 specific management areas, each with a different emphasis that is intended to direct management activities on that particular piece of land. Management area allocations are specific to areas across the Forest with similar management needs and desired conditions.

This chapter includes a description of the management areas, acres allocated, and management direction in the form of desired conditions, standards, guidelines, objectives, and suitability of lands.

The management area categories are listed in table 22 below. Management areas by geographic area are included in chapter 4, and the corresponding maps are figures B-18 through B-24.

Table 22. Management areas

Code	Management Area Category
1a	Designated wilderness
1b	Recommended wilderness
2a	Designated wild and scenic rivers
2b	Eligible wild and scenic rivers
3a	Administrative areas
3b	Special areas
4a	Research natural areas
4b	Experimental and demonstration forests
5a	Backcountry nonmotorized year-round primitive
5b	Backcountry motorized year-round (motorized vehicle use only on designated roads, trails, and areas)
5c	Backcountry motorized over-snow vehicle opportunities (on designated routes and areas)
5d	Backcountry motorized wheeled vehicle use on designated roads, trails, and areas from April 1 to November 30
6a	General forest low-intensity vegetation management
6b	General forest medium-intensity vegetation management
6c	General forest high-intensity vegetation management
7	Focused recreation areas

Management area desired conditions are indications of the future conditions that would typically be desired in each management area. They help clarify the general suitability of various parts of the Forest for different activities and management practices (management area desired conditions are part of the “suitability of areas” guidance discussed on page 1). These desired conditions help clarify the outcomes that might be expected in land areas with different general suitability descriptions. Suitability is discussed by management area and summarized at the end of this chapter.

1a Designated Wilderness

Background

The Forest contains 1,069,933 acres of designated wilderness, which accounts for about 45 percent of the Forest (see table 23). There are three designated wilderness areas within the Forest: the Bob Marshall, the Great Bear, and the Mission Mountains Wilderness Areas. Wilderness lands provide a variety of primitive recreation opportunities that include hiking, hunting, fishing, and horseback riding at the primitive end of the spectrum.

The Mission Mountains Wilderness is adjacent to the Mission Mountains Tribal Wilderness to the west, which is managed by the Confederate Salish and Kootenai Tribes. The Mission Mountains Wilderness is managed to protect wilderness character as defined by the Wilderness Act.

The Bob Marshall, Great Bear, and Scapegoat (the Scapegoat is not on the Forest) wilderness areas comprise the Bob Marshall Wilderness Complex, which makes up an area of more than 1.5 million acres. Management responsibility for the Bob Marshall Wilderness Complex is shared with the Helena-Lewis and Clark and Lolo National Forests. These areas are managed to protect their wilderness character as defined by the Wilderness Act of 1964.

Table 23: Designated wilderness areas on the Forest

Name	Acres ^a
Bob Marshall	712,331
Great Bear	286,872
Mission Mountains	76,173

a. Acres are from GIS dataset and include acres for all waterbodies. The official acres for wilderness areas can be found in the land area report (USDA (2015), Land areas of the National Forest System (LAR), USDA Forest Service, Lands and Realty Management, retrieved from <https://www.fs.fed.us/land/staff/lar-index.shtml>).

Desired conditions (MA1a-DC)

- 01** Designated wilderness areas are managed to preserve and protect their wilderness character as required by the Wilderness Act and each wilderness area's enabling legislation. Wilderness character includes the qualities of untrammeled, undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and other features of value (ecological, geological, scientific, scenic, or historic value unique to each specific wilderness area).
- 02** Natural ecological processes and disturbances (e.g., succession, wildfire, avalanches, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation. Wilderness areas provide opportunities for visitors to experience natural ecological processes and disturbances with a limited amount of human influence.
- 03** Facilities in the Bob Marshall and Great Bear Wilderness Areas provide for the protection and management of the wilderness resource.
- 04** Non-native invasive species are nonexistent or in low abundance and do not disrupt ecological functions.
- 05** The current trail system in the Bob Marshall, Mission Mountains, and Great Bear Wilderness Areas on the Forest is managed to provide for wilderness experience.

- 06 Existing outfitter and guide service opportunities are maintained in the Bob Marshall Wilderness Complex and the Mission Mountains Wilderness as determined by identified public need.
- 07 The Schafer Meadows airstrip serves as an airplane-accessible trailhead.
- 08 The Bob Marshall and Mission Mountains Wilderness Areas are class I air quality areas and managed as such; the Great Bear Wilderness is managed as a class II area.
- 09 Each wilderness area accommodates levels of recreational use that are ecologically sustainable.
- 10 Concentrated use areas within wilderness areas and associated resource impacts are not expanding into nearby areas.

Standards (MA1a-STD)

- 01 Group sizes in excess of 15 people and 35 head of livestock per party within the Bob Marshall and Great Bear Wilderness Areas shall not be authorized.
- 02 Group sizes in excess of eight people and eight head of livestock per party within the Mission Mountains Wilderness shall not be authorized.
- 03 No permanent structures for the administration of the Mission Mountains Wilderness shall be built.
- 04 Prehistoric resources shall not be maintained, rehabilitated, restored, or interpreted within the Mission Mountains Wilderness.

Guidelines (MA1a-GDL)

- 01 To protect water quality and aquatic habitat, tethering and grazing of recreational stock should be more than 100 feet from lakeshores.
- 02 To protect the social and ecological conditions within the Flathead National Forest portion of the Bob Marshall Wilderness Complex, additional outfitter and guide permit use levels should not be issued nor should approval be granted to expand operations beyond 17,953 days for the Flathead National Forest service day use in all seasons of the 30,000 service days authorized across the Bob Marshall Wilderness Complex.
- 03 To protect wilderness character, motorized use and mechanized transport should not be allowed within designated wilderness areas except as allowed by the Wilderness Act and the wilderness area's enabling legislation.
- 04 To protect wilderness character and cave resources, wilderness caves should not be signed, disclosed on maps, mentioned in brochures, or have monument markers indicating a cave name or number outside of the cave.

Suitability (MA1a-SUIT)

- 01 Designated wilderness areas are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).
- 02 Wilderness areas are not suitable for timber production or timber harvest
- 03 Wilderness areas are not suitable for commercial use of non-timber forest products (e.g., firewood, mushrooms, huckleberries).

1b Recommended Wilderness Areas

Description

Recommended wilderness areas are lands that the Forest Service has recommended for consideration as wilderness. The Forest Service only recommends these lands to the U.S. Congress for consideration. Congress, and ultimately the president, must establish legislation (through a wilderness bill) to officially designate a wilderness area.

The specific areas being recommended for inclusion in the National Wilderness Preservation System are shown in table 24.

Table 24. Total approximate acres of areas recommended for inclusion in the National Wilderness Preservation System

Recommended wilderness area	Acres*
Alcove-Bunker	18,901
Elk Creek	1,442
Java-Bear Creek	1,824
Jewel Basin	18,462
Limestone-Dean Ridge	15,026
Slippery Bill-Puzzle	12,393
Swan Front	42,534
Tuchuck-Whale	79,821
Total Acres	190,403

*Acres are from GIS dataset and include acres for all waterbodies.

Desired conditions (MA1b-DC)

- 01** Recommended wilderness areas preserve opportunities for inclusion in the National Wilderness Preservation System. The Forest maintains and protects the ecological and social characteristics that provide the basis for wilderness recommendation.
- 02** Recommended wilderness areas are characterized by a natural environment where ecological processes such as natural succession, wildfire, avalanches, insects, and disease function with a limited amount of human influence.
- 03** The Jewel Basin hiking area portion of the Jewel Basin recommended wilderness area provides a recreation experience without motorized, mechanical transport or stock use.

Standards (MA1b-STD)

- 01** Commercial communications sites shall be located outside of recommended wilderness areas.

Guidelines (MA1b-GDL)

- 01** To maintain and protect wilderness characteristics, other agencies' communications sites for public safety should be located outside of recommended wilderness areas unless no other alternative is available. If they have to be located in a recommended wilderness area, they should blend with the environment and be located away from system trails and developed sites.

- 02** To maintain and protect wilderness characteristics, new developed recreation facilities with provisions for user comfort such as picnic tables, fire grills, and vault toilets should not be installed.

Suitability (MA1b-SUIT)

- 01** The Jewel Basin recommended wilderness area is not suitable for additional outfitting and guiding or large group events.
- 02** Recommended wilderness areas are not suitable for timber production; timber harvest is not allowed.
- 03** Recommended wilderness areas are suitable for restoration activities where the outcomes will protect the wilderness characteristics of the areas, as long as the ecological and social characteristics that provide the basis for wilderness recommendation are maintained and protected.
- 04** Recommended wilderness areas are not suitable for road construction or reconstruction.
- 05** Recommended wilderness areas are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).
- 06** Mechanized transport and motorized use are not suitable in recommended wilderness areas.
- 07** The Jewel Basin hiking area²⁵ is not suitable for motorized use, mechanized transport, and stock use.

2a and 2b: Wild and Scenic Rivers

Introduction

This management area applies to river segments that are either designated or eligible for inclusion as part of the wild and scenic river system under the authority granted by the Wild and Scenic Rivers Act of 1968, as amended.

For wild and scenic rivers, the designated management boundaries generally consist of an area that averages 0.25 mile wide on either bank to protect river-related values.

Wild and scenic river segments are classified as wild, scenic, or recreational.

- wild river segment—Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- scenic river segment—Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.
- recreational river segment—Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

²⁵ The Jewel Basin hiking area is a designated area within the Jewel Basin recommended wilderness area.

Desired conditions (MA2-DC)

- 01 The free-flowing conditions and water quality of designated wild and scenic rivers are protected and enhanced.
- 02 The outstandingly remarkable values of designated wild and scenic rivers are protected and enhanced.
- 03 Designated or eligible wild rivers are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.
- 04 Designated or eligible scenic rivers are free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads.
- 05 Federal lands within the wild and scenic river corridor are retained in public ownership.
- 06 Administrative facilities on designated wild and scenic rivers are screened or designed to blend into the natural river environment and development is consistent with the river's classification.
- 07 Commercial outfitted river use is a key element in providing guided fishing and rafting experiences on the Flathead Wild and Scenic River.

Standards (MA2-STD)

- 01 Wilderness management direction must be followed where segments of the Flathead Wild and Scenic River (portions of the South and Middle Forks of the Flathead) are located in the wilderness.
- 02 Designated rivers must be managed to protect the free-flowing character, water quality, and outstandingly remarkable values for which they were designated.

Guideline (MA2-GDL)

- 01 To protect the outstandingly remarkable values, impacts from recreational use should be in the acceptable range per the direction in the Flathead Wild and Scenic River Recreation Management Direction²⁶.

2a Designated Wild and Scenic River

Description

The Forest has one designated wild and scenic river, the Flathead River. Its three forks—the South Fork, Middle Fork, and North Fork—were designated by Congress in 1976 for a total of 219 miles. Table 25 lists the outstandingly remarkable values, miles, and acres of the designated wild and scenic river.

Table 25. Outstandingly remarkable values, miles, and acres of the designated Flathead Wild and Scenic River

Designated WSR	Outstandingly Remarkable Values	Miles ^a	Acres ^b
Middle Fork of the Flathead River	<u>Wild section</u> : fisheries, geology, water quality, wildlife, botany, recreation, scenery, history, ethnographic <u>Recreation segment</u> : fisheries, geology, water quality, wildlife, recreation, scenery, history	96	19,421

²⁶ USDA (1986), Flathead Wild and Scenic River recreation management direction (Kalispell, MT: USDA Forest Service, Flathead National Forest), planning record exhibit # 00655.

Designated WSR	Outstandingly Remarkable Values	Miles ^a	Acres ^b
North Fork of the Flathead River	<u>Scenic section</u> : fisheries, geology, water quality, wildlife, botany, recreation, scenery, history, ethnographic <u>Recreation section</u> : fisheries, geology, water quality, wildlife, recreation, history	59	6,256
South Fork of the Flathead River	<u>Wild/wilderness section</u> : fisheries, geology, water quality, wildlife, botany, recreation, scenery, history, ethnographic <u>Wild/non-wilderness section</u> : fisheries, geology, water quality, wildlife, recreation, scenery, history, ethnographic <u>Recreation section</u> : fisheries, geology, water quality, wildlife, recreation, scenery, history, ethnographic	61	16,484

a. Miles are approximate.

b. Designated wild and scenic river acres overlapping with designated wilderness total 24,570 acres.

Suitability (MA2a-SUIT)

- 01** Wild river corridors are not suitable for timber production or for commercial use of non-timber forest products; timber harvest is not allowed.
- 02** Scenic and recreational river corridors are not suitable for timber production; however, timber harvesting for other multiple-use purposes, for salvage logging, and to achieve desired vegetation conditions could occur.
- 03** Scenic river corridors are suitable for non-commercial (personal) use of non-timber forest products.
- 04** Recreational river corridors are suitable for the commercial and non-commercial (personal) use of non-timber forest products.
- 05** Scenic and recreational river segments are suitable for commercial communications sites and utility corridors. The scenic section of the North Fork of the Flathead is not suitable for utility corridors.
- 06** Wild river corridors outside of designated wilderness are suitable for mechanized transport and motorized use and equipment.
- 07** Scenic and recreational river corridors are suitable for wheeled motorized travel consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas.
- 08** Suitability for motorized over-snow vehicle use is mapped in figures B-11 and B-12.
- 09** Wild river corridors are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).

2b Eligible Wild and Scenic Rivers

Twenty-four rivers on the Forest, totaling about 284 miles of rivers within NFS lands, have been identified as eligible wild and scenic rivers (table 26). These rivers have the potential to be designated as wild and scenic rivers through legislation. For more information about rivers identified as eligible for inclusion in the National Wild and Scenic River System, refer to appendix 5 of the final EIS.

Table 26. Eligible wild and scenic rivers

River	Segment	Preliminary Classification	Outstandingly Remarkable Values	Length (miles)	Acres ^a
Aeneas	Headwaters to Hungry Horse Reservoir	Scenic	History, prehistory, recreation, scenery	5	1,770

River	Segment	Preliminary Classification	Outstandingly Remarkable Values	Length (miles)	Acres ^a
Big Salmon	Lena Lake to South Fork of the Flathead; includes Big Salmon Lake	Wild	Recreation, geology, fish, prehistory	19	4,727
Clack	Headwaters to Middle Fork of the Flathead River	Wild	Geology, scenery	8	2,021
Danaher	Headwaters to Youngs Creek	Wild	Scenery, recreation, fish, wildlife, history, prehistory, botany, natural area	23	6,042
Elk	Headwaters to Forest boundary	Scenic	Fish	10	2,636
Gateway	Headwaters to Strawberry Creek	Wild	Scenery, geology, history	5	1,745
Glacier	Headwaters to outlet of Glacier Slough	Wild segment: within Mission Mountains Wilderness; Scenic segment: wilderness boundary to outlet of Glacier Slough	Geology, wildlife, scenery	6	1,774
Graves	Headwaters to Hungry Horse Reservoir	Wild segment: within Jewel Basin hiking area; Scenic segment: from boundary of Jewel Basin Hiking Area to Hungry Horse Reservoir	Prehistory	10	2,467
Le Beau	Headwaters to Le Beau Research Natural Area boundary	Wild	Scenery, geology, natural area	4	1,325
Lion	Headwaters to Lion Creek Trailhead	Scenic	Wildlife	11	3,315
Little Salmon	Headwaters to South Fork of the Flathead River	Wild	Scenery, fish, prehistory	19	5,513
Logan	From NFS Road 539 to Tally Lake	Recreational	Scenery, recreation	4	1,274
Schafer	Headwaters to Middle Fork of the Flathead River	Wild	Prehistory, history	11	2,947
Spotted Bear	Headwaters to South Fork of the Flathead River	Wild segment: headwaters to end of Blue Lake; Recreational segment: Blue Lake to South Fork of the Flathead	Recreation, wildlife, geology	35	10,261
Strawberry	Headwaters to Middle Fork of the Flathead River	Wild	Fish	14	3,869
Swan, lower	Swan River State Forest to Swan Lake ^b	Recreational	Wildlife	11	1,432
Swan, upper	Headwaters to confluence with Lindbergh Lake	Wild	Recreation	2	837

River	Segment	Preliminary Classification	Outstandingly Remarkable Values	Length (miles)	Acres ^a
Twin (also known as Upper Twin)	Nanny Creek to confluence with South Fork of the Flathead	Wild segment: From Nanny Creek to confluence with North Creek; Recreational segment: North Creek to confluence with South Fork of the Flathead	Geology, scenery	6	1,766
Whale	Headwaters to USFS boundary	Scenic segment: Headwaters to confluence to Shorty Creek; Recreational segment: Shorty Creek to USFS boundary	Wildlife, fish	21	6,263
White	Entire segment	Wild	Geology, fish, history, prehistory, scenery	24	6,964
Nokio	Nokio Creek along NFS Road 114 to confluence with Yakinikak Creek;	Scenic	Prehistory	3	672
Yakinikak	Yakinikak Creek to confluence with Thoma Creek (stream becomes Trail Creek);	Scenic	Prehistory	8	2,319
Trail (North Fork)	Trail Creek to USFS boundary	Scenic	Fish, prehistory, geology, wildlife	2	1,475
Youngs	Headwaters to South Fork of Flathead	Wild	Fish, recreation, prehistory, history, scenery	23	6,462

a. There are 47,680 acres of management area 2b within management area 1a, 10,395 acres in management area 1b, and 1,325 acres in management area 4a.

b. Plan direction for management area 2b is only for NFS lands. About 6 miles of this segment is on the Swan River State Forest, which is non-NFS and land and therefore the plan direction does not apply.

Desired conditions (MA2b-DC)

- 01 The free-flowing character of eligible wild and scenic rivers is maintained.
- 02 Outstandingly remarkable values of eligible wild and scenic rivers are protected.
- 03 Eligible wild river segments are free of impoundments and generally inaccessible except by trail, with watersheds and/or shorelines essentially primitive and waters unpolluted.
- 04 Eligible scenic river segments are free of impoundments, with watersheds and/or shorelines still largely primitive and undeveloped but accessible in places by roads.
- 05 Eligible recreational river segments are accessible by road or railroad, may have some shoreline development, and may have had an impoundment or diversion in the past.

Suitability (MA2b-SUIT)

- 01 Eligible wild river segments are not suitable for timber production; timber harvest is not allowed.
- 02 Eligible scenic and recreational river segments are not suitable for timber production; however, timber harvesting for other multiple-use purposes, for salvage logging, and to achieve desired vegetation conditions could occur.

- 03** Eligible scenic and recreational river segments are suitable for commercial and non-commercial (personal) use of non-timber forest products.
- 04** Eligible scenic and recreational river segments are suitable for commercial communications sites or utility corridors.
- 05** Eligible wild river classification segments outside of designated wilderness and Jewel Basin hiking area (are suitable for mechanized transport).
- 06** Eligible scenic and recreational river classification segments are suitable for wheeled motorized travel consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas.
- 07** Suitability for motorized over-snow vehicle use is mapped in figures B-11 and B-12.
- 08** Eligible wild river corridors are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).
- 09** Eligible scenic and recreational rivers are suitable for mineral material disposal if the values for which the river may be included in the National Wild and Scenic Rivers System are protected.

3a and 3b: Administrative and Special Areas

Introduction

Located across the Forest, these special places have unique, unusual, or important characteristics. They are administratively designated areas. Special areas are managed for public use and enjoyment and to protect and conserve the values for which they were identified. Administrative areas are areas designated as necessary for the administration of duties associated with management of NFS lands.

3a Administrative areas

Administrative areas are facilities and infrastructure, typically buildings and their appurtenances, necessary to support the employees, equipment, and activities necessary for the administration and management of the national forests. Refer to table 27 for administrative sites on the Forest.

Table 27. Administrative sites on the Forest

Geographic Area	Site Name	Type of Area	Acres^a
Hungry Horse	Hungry Horse Ranger Station*	Ranger Station	202
South Fork	Spotted Bear Ranger Station*	Ranger Station	148
Swan Valley	Old Condon Ranger Station (historical)	Ranger Station	13
Salish Mountains	Swan Lake Ranger Station*	Ranger Station	13
North Fork	Big Creek Environmental Education Center	Work Center	12
Hungry Horse	Coram	Work Center	355
Hungry Horse	Betty Creek (historical)	Work Center	7
Middle Fork	Fielding (historical)	Work Center	14
Middle Fork	Schafer Meadows	Work Center	7
South Fork	Big Prairie	Work Center	70
Swan Valley	Condon*	Work Center	10

Geographic Area	Site Name	Type of Area	Acres^a
Salish Mountains	Tally Lake (historical)	Work Center	13
North Fork	Nasukoin Lake (historical)	Guard Station	<1
North Fork	Ninko	Guard Station	1
North Fork	Whale Lake (historical)	Guard Station	<1
Hungry Horse	Crevice Cabin	Guard Station	<1
Middle Fork	Challenge Cabin	Guard Station	3
Middle Fork	Gooseberry Park	Guard Station	2
Middle Fork	Granite Creek	Guard Station	1
Middle Fork	Sabido	Guard Station	1
Middle Fork	Spruce Park	Guard Station	2
South Fork	Basin	Guard Station	4
South Fork	Black Bear	Guard Station	2
South Fork	Danaher	Guard Station	1
South Fork	Hahn	Guard Station	2
South Fork	Pendant	Guard Station	1
South Fork	Pentagon	Guard Station	1
South Fork	Salmon Forks	Guard Station	45
South Fork	Shaw	Guard Station	2
Swan Valley	Elbow (historical)	Guard Station	<1
Swan Valley	Swan Lake	Guard Station	<1
Swan Valley	Trinkus Cabin	Guard Station	<1
Swan Valley	Upper Holland Lake	Guard Station	1
Salish Mountains	Star Meadows	Guard Station	4
North Fork	Coal Ridge (historical)	Fire Lookout	1
North Fork	Cyclone (communications site as well)	Fire Lookout	4
North Fork	Thoma (communications site as well)	Fire Lookout	5
Hungry Horse	Baptiste (communications site as well)	Fire Lookout	3
Hungry Horse	Firefighter (communications site as well)	Fire Lookout	8
Middle Fork	Red Plume Mountain (historical)	Fire Lookout	<1
South Fork	Jumbo Mountain (communications site as well)	Fire Lookout	<1
South Fork	Limestone	Fire Lookout	<1
South Fork	Mud Lake Mountain (communications site as well)	Fire Lookout	<1
South Fork	Spotted Bear (communications site as well)	Fire Lookout	2
Swan Valley	Cooney	Fire Lookout	1
Swan Valley	Holland	Fire Lookout	<1
Middle Fork	Schafer Meadows	Fire Lookout	33
South Fork	Meadow Creek	Fire Lookout	32
South Fork	Spotted Bear	Fire Lookout	37
Swan Valley	Condon	Fire Lookout	28

Geographic Area	Site Name	Type of Area	Acres^a
Hungry Horse	Desert Mountain	Commercial Communication Site	10
Middle Fork	Middle Fork Corridor	Commercial Communication Site	2
Salish Mountains	Big Mountain	Commercial Communication Site	3
Salish Mountains	Blacktail Mountain	Commercial Communication Site	30
Swan Valley	Mount Aeneas	Commercial Communication Site	6
North Fork	Cyclone Peak	FS Admin. Communication Site	<1
North Fork	Mount Hefty	FS Admin. Communication Site	<1
North Fork	Werner Peak	FS Admin. Communication Site	<1
Hungry Horse	Mount Baptiste	FS Admin. Communication Site	<1
Middle Fork	Patrol Ridge	FS Admin. Communication Site	<1
South Fork	Stony Hill	FS Admin. Communication Site	<1
Swan Valley	Elbow	FS Admin. Communication Site	1
Swan Valley	Napa	FS Admin. Communication Site	1
Salish Mountains	Ashley Mountain	FS Admin. Communication Site	<1
Salish Mountains	Kerr Mountain	FS Admin. Communication Site	1
North Fork	Elelehum Test Plantation	Silvicultural Site	12
North Fork	Mud Lake Test Plantation	Silvicultural Site	14
Hungry Horse	Firefighter Test Plantation	Silvicultural Site	8
Swan Valley	Cold Ridge Test Plantation	Silvicultural Site	27
Swan Valley	Condon Test Plantation	Silvicultural Site	78
Swan Valley	Weed Hill Test Plantation	Silvicultural Site	7
Salish Mountains	Bigfork Tree Improvement*	Silvicultural Site	92
Salish Mountains	Plume Creek Test Plantation	Silvicultural Site	18
North Fork	China Basin (historical)	Miscellaneous	<1
North Fork	Coal Ridge Cabin (historical)	Miscellaneous	1
North Fork	Funk Schoolhouse	Miscellaneous	<1
North Fork	Kintla Ranch	Miscellaneous	3
North Fork	Moose Creek Cabin (historical)	Miscellaneous	<1
South Fork	East-Side Cable Car over South Fork (USGS permitted)	Miscellaneous	<1
South Fork	Upper Big Bill administrative trailhead	Miscellaneous	1
South Fork	West-Side Cable Car over South Fork (USGS permitted)	Miscellaneous	<1
Swan Valley	Jewel Basin Camp Misery cabin	Miscellaneous	<1
Swan Valley	Owl Creek Packer Barn	Miscellaneous	<1
Hungry Horse	2 sites	Snowtel and snow-monitoring sites ^b	<1

Geographic Area	Site Name	Type of Area	Acres^a
Middle Fork	1 site	Snowtel and snow-monitoring sites ^b	<1
South Fork	2 sites	Snowtel and snow-monitoring sites ^b	1
Swan Valley	5 sites	Snowtel and snow-monitoring sites ^b	<1
Salish Mountains	7 sites	Snowtel and snow-monitoring sites ^b	1
North Fork	12 sites	Gravel pits, quarries, borrow sources ^b	27
Hungry Horse	14 sites	Gravel pits, quarries, borrow sources ^b	35
Middle Fork	4 sites	Gravel pits, quarries, borrow sources ^b	11
South Fork	3 sites	Gravel pits, quarries, borrow sources ^b	14
Swan Valley	13 sites	Gravel pits, quarries, borrow sources ^b	43
Salish Mountains	33 sites	Gravel pits, quarries, borrow sources ^b	68

* Site is mapped in the GIS dataset.

a. Total acres are more than in the GIS dataset, in which only the sites marked with an asterisk are mapped.

b. Summarized; not listed individually.

Note. The term "historical" refers to sites that are no longer used by the Forest for administrative purposes.

Desired conditions (MA3a-Admin-DC)

- 01** Administrative sites serve land management needs and purposes of the Forest in a sustainable, economical, and cost-effective manner.

Objectives (MA3a-Admin-OBJ)

- 01** Complete 5 to 15 facilities projects to improve energy efficiency, safety, or accessibility.

Suitability (MA3a-Admin-SUIT)

- 01** Administrative sites are not suitable for timber production, but timber harvest to achieve desired vegetation conditions and other multiple-use purposes could occur.
- 02** Administrative sites are not suitable for commercial use of non-timber forest products.
- 03** Administrative sites are suitable for wheeled motorized travel on designated routes and areas unless otherwise restricted.
- 04** Suitability for motorized over-snow vehicle use is mapped in figures B-11 and B-12.

3b Special Areas

Fourteen special areas totaling 3,033 acres are designated on the Forest. Table 28 lists these special areas and their primary features, with fens being listed alphabetically first. All special areas are designated based on their special botanical features, with associated hydrologic or geological features in some areas. The boundary of the fen special areas includes a 300-foot buffer (riparian management zone) surrounding each fen. See figures B-27 to B-28 for maps of these areas.

Table 28. Special areas

Name	Geographic Area	Special character and features	Acres^a
Bent Flat Fen	South Fork	A unique, extremely rich fen with well-developed patterning, extensive marl deposits, and a large number of rare plants that are restricted to calcareous habitats. The Trail Creek Fire in August of 2015 burned the forest surrounding and immediately adjacent to the fen.	44
Condon Creek Botanical Area	Swan Valley	Concentration of pond habitats occupied by water howellia, a federally threatened plant species. Associated with upland mixed conifer forest featuring several groves of mature ponderosa pine as well as western larch and Douglas-fir.	226
Gregg Creek Fen	Salish Mountains	Features peatland, wet forest, and shrub communities within an undisturbed portion of the Gregg Creek watershed. Rare plants present.	33
Lost Creek Fens	Swan Valley	Contain two distinctly different types of fens separated by a patch of moist coniferous forest. The northern fen is at the toe of a slope. An upwelling spring supplies water to a thick accumulation of peat that slopes gently to the south. The southern fen has two shallow potholes filled with peat and alluvium. The water table fluctuates seasonally; drawdown in the fall hastens peat decomposition and minimizes peat accumulation. A number of rare plant species are present at both sites.	36
Meadow Lake Fen	Swan Valley	One of the few places on the Forest that has a floating organic mat. Rare plants present. Loons and bog lemmings have also been observed at this lake.	62
Porcupine Fens	Swan Valley	Features two fens that are part of a larger complex of fens. Porcupine Fen is at the toe of a slope from which several springs emerge. This constant supply of mineral-rich water has favored the accumulation of organic matter. The site supports diverse flora. The site is largely ringed by wet to moist spruce forests except on a portion of the west margin, where a harvested area upslope of the fen extends down nearly to the fen. The site is an excellent example of a flow-through fen. A number of rare plants occur.	145
Sanko Creek Fen North	Salish Mountains	Features two wetland areas. One is a small pond, up to 4 meters deep and surrounded by a floating to anchored organic mat and a wet meadow. The other wetland is a north-south-oriented fen. The fen is surrounded by moist spruce forest. The fen has a series of broad, gently sloping terraces with interspersed water tracks and upwelling pools of water. Western larch is common on adjacent uplands. Rare plant species have been observed at the site.	49
Sanko Creek Fen South	Salish Mountains	Oriented east-west along the base of a slope. A number of seeps and springs emerge from the toe of this slope and maintain wet conditions in the peatland. One rare plant species has been observed here, as well as a possible bog lemming.	23
Trail Creek Fen	South Fork	A relatively large, highly calcareous peatland. The site contains three abandoned beaver dams and ponds and a well-developed peatland on the upper easternmost portion of the wetland. Several rare plants occupy this relatively large, well-developed peatland.	98
Trout Lake Fen	Hungry Horse	Trout Lake is an excellent example of an organic mat (floating and anchored) surrounding a deep pond. A sedge meadow lies southwest of the pond. Several species of sphagnum moss form a nearly continuous carpet adjacent to the pond. Rare plant species have been observed in the peat mat. The site is easily accessible by motor vehicle and supports a handicapped-accessible fishing dock. Most of the organic mat, however, is undisturbed by human use.	34
Windfall Creek Fen	Swan Valley	Occupies a basin formed by glacial scouring. Rare plant species have been observed here.	31

Name	Geographic Area	Special character and features	Acres ^a
Glacier Slough	Swan Valley	One of the largest wetlands in the Swan Valley, with a diversity of wetland- and riparian-associated plant and animal species and adjacent forests of mixed conifer species.	1,690
Johnson Terrace	Salish Mountains	Includes a mossy forb meadow on shallow residual soils over a Precambrian argillite bedrock dip slope that is inundated with water in the spring and dries out during summer. There are many diminutive plants that are restricted to this type of ephemeral spring habitat. In addition to botanical features, contains geologic/topographic features that harbor a diversity of plants unique to this Forest.	331
Fatty Creek Cedars	Swan Valley	Moist, riparian-associated western red cedar forest type supporting stands dominated by very large, old cedar trees and associated unique assemblages of understory plants. Provides aesthetic values associated with "ancient" cedar groves. Groves such as this are relatively rare on the Forest due to the limited area with suitable site conditions for their development, past fire disturbance, and removal through previous logging or development activities.	261
Total Acres			3,063

a. The GIS dataset for management areas only has the Condon Creek Botanical Area, Glacier Slough, Johnson Terrace, and Fatty Creek Cedars areas mapped, and therefore the acres differ from those given in this table.

Desired conditions (MA3b-Special Area-DC)

- 01 Special areas are in a substantially natural condition, in which ecosystems primarily reflect the influence of natural processes and the plant and wildlife habitat values for which the special area was identified are maintained.
- 02 Minimal to no invasive plant species occur within the special areas.
- 03 Educational and research opportunities featuring the plant communities are provided.
- 04 In the Condon Creek Botanical Area, habitat conditions support sustainable and healthy populations of water howellia. Mature ponderosa pine and western larch forests occur, contributing to the landscape conditions that sustain water howellia habitat as well as providing educational and research opportunities.

Suitability in special areas (MA3b-Special Area-SUIT)

- 01 Special areas are not suitable for timber production. Vegetation management activities (such as prescribed fire) may be allowed if specifically designed to restore or enhance the terrestrial or aquatic resources associated with the special area.
- 02 Special areas are not suitable for commercial use of non-timber forest products.
- 03 Special areas are not suitable for construction of new wheeled motorized trails and areas or associated structures. Existing trails that access these areas are suitable.
- 04 Suitability for motorized over-snow vehicle use is mapped in figure B-11.
- 05 Special areas are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).

4a and 4b: Designated Research Natural Areas, Experimental Forest, and Demonstration Forest

Introduction

The Forest has six research natural areas, one experimental forest, and one demonstration forest. Research natural areas are permanently established to maintain representative areas of natural ecosystems and areas of special ecological significance. The Coram Experimental Forest was established to study the ecology and silviculture of western larch in a mix with other commonly associated species. The Miller Creek Demonstration Forest was established to study the effects of prescribed fire and silvicultural treatments on regeneration and other forest conditions.

4a Designated Research Natural Areas

Description

The Forest has six designated research natural areas, listed in table 29. The research natural areas are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on NFS lands. They serve as baseline areas for non-manipulative research, observation, and study. Each research natural area has its own establishment record²⁷ that contains detailed location maps, information on distinguishing features, and the purpose for which the research natural area was established. The research natural areas are cooperatively managed with the Rocky Mountain Research Station.

Table 29. Existing research natural areas

Research Natural Area	Location/Ranger District (RD)	Key Features	Date established	Official acres ^a	GIS acres ^b
Coram	Within the Coram Experimental Forest/ Hungry Horse-Glacier View RD	Forests of late-successional/old-growth forests composed of western larch and interior Douglas-fir stands.	1988	839	876
East Shore	Crane Mountain area, facing into Flathead Lake above Woods Bay/Swan Lake RD	Transition vegetation types ranging from aquatic and moist sites to dry sites within the Douglas-fir, grand fir, and western red cedar habitat type series.	1991	646	654
Le Beau	Within Le Beau Creek in the Stillwater River drainage/Tally Lake RD	High diversity of vegetation types and geologic landforms. Western red cedar, western hemlock, grand fir, larch, and herbaceous plant communities on glacier-formed rocky land, lake, ponds, and wetlands.	1997	5,709	5,397

²⁷ Establishment records are located at the forest supervisor's office.

Research Natural Area	Location/Ranger District (RD)	Key Features	Date established	Official acres ^a	GIS acres ^b
Little Bitterroot	Southwest of Marion along the Little Bitterroot River in the "Island Unit"/Swan Lake RD	Lies within a narrow, steep-walled canyon with two narrow lakes at the base of the cliffs. Below the lakes are shrub-dominated riparian areas. Dry site Douglas-fir forests dominate, representing all four phases of the dry Douglas-fir/pinegrass habitat type.	1991	200	202
Swan River	Along the Swan River south of Swan Lake, Porcupine Creek area/Swan Lake RD	Contains upland forests dominated by old western larch as well as mature western red cedar, grand fir, western white pine, and Douglas-fir. Contains wetland and riparian plant communities dominated by western red cedar, spruce, black cottonwood, and various shrub and herbaceous species. Wet meadows, bogs, peatlands, river edges, and beaver ponds present.	1997	682	692
Tuchuck	Within Tuchuck Creek, a tributary of Trail Creek that flows into the North Fork of the Flathead River just south of the Canadian border/Hungry Horse-Glacier View RD	Upper-elevation and alpine vegetation types; avalanche chutes and open areas dominated by shrubs and herbaceous species; wet meadows and talus slopes. Extensive stands of whitebark pine as well as alpine larch.	1991	2,062	2,050
TOTAL ACRES				10,138	9,871 ^b

a. Acres from the establishment record (the official research natural area acreage).

b. Acres from the Forest's GIS datasets are presented in this table.

Desired conditions (MA4a-DC)

- 01 Research natural area lands generally appear natural. Ecological processes such as plant succession and fire, insect, and disease activity function with limited human influences.
- 02 Research natural areas serve as areas for the observation and study of relatively undisturbed ecosystems and ecological processes, including succession, and as baseline areas for measuring ecological change due to disturbances or stressors such as climate change.
- 03 The ecological features and values for which each research natural area was established are protected and managed in accordance with its establishment record, with any management plans established for the individual research natural area, and in consultation with Rocky Mountain Research Station.

Suitability (MA4a-SUIT)

- 01 Research natural areas are not suitable for timber production. Timber harvest (outside of designated and recommended wilderness) and other vegetation management (such as prescribed fire) may be allowed for study and research purposes and in situations where the values for which the research natural area was designated would be degraded or lost without management.
- 02 Research natural areas outside of designated and recommended wilderness are suitable for nonmotorized travel, with wheeled motorized travel suitable on designated routes consistent with

desired recreation opportunity spectrum settings as mapped to meet administrative, research, and educational objectives.

- 03 Suitability for motorized over-snow vehicle use is mapped in figure B-11.
- 04 Research natural areas are not suitable for removal of salable mineral material (includes sand, stone, gravel, cinders, clay, pumice, and pumicite).

4b Experimental Forest and Demonstration Forest

Coram Experimental Forest

Description

The approximately 7,500-acre Coram Experimental Forest was established in 1933 to study the ecology and silviculture of western larch in a mix with other commonly associated species. The Rocky Mountain Research Station is responsible for all research and usage activities on the Coram Experimental Forest. The Flathead National Forest is responsible for all non-research-based general management activities that occur on the Coram Experimental Forest. A letter of agreement between the Rocky Mountain Research Station and the Flathead National Forest contains an operating plan and fire management plan that further clarifies the responsibilities of each party and the protocol for coordination of activities on the Coram Experimental Forest.²⁸

The Coram Research Natural Area is located within the Coram Experimental Forest. More information about the Coram Research Natural Area is located in the Description section under 4a Research Natural Areas above.

Desired conditions (MA4b-CEF-DC)

- 01 The Coram Experimental Forest serves as a demonstration and study area for researchers, educators, forest managers, and the public. It provides areas that can be used for new administrative or research studies to help answer current and future management questions as well as areas that can be used for educational activities and demonstrations.
- 02 Remeasurement and evaluation of long-term studies continue, as well as the collection of baseline hydrology, climate, and other resource information.
- 03 Research facilities and infrastructure (e.g., office building, weather stations, roads and trails, and signs) are sufficient to support the research and education programs of the Coram Experimental Forest.

Guidelines (MA4b-CEF-GDL)

- 01 Fires should be suppressed in the Coram Experimental Forest.

²⁸ USDA (2016), Letter of agreement between the USDA Forest Service Rocky Mountain Research Station and the Flathead National Forest: Coram Experimental Forest, Kalispell, MT: USDA Forest Service, Flathead National Forest, planning record exhibit # 00563.

Suitability for the Coram Experimental Forest (MA4b-CEF-SUIT)

- 01 The Coram Experimental Forest is not suitable for timber production; however, timber harvesting for salvage logging, for research purposes, and to achieve desired vegetation conditions could occur, as mutually agreed upon between the Rocky Mountain Research Station and the Forest.
- 02 The Coram Experimental Forest is not suitable for the removal of non-forest products for commercial use.
- 03 The Coram Experimental Forest is not suitable for the removal of the following non-forest products for personal use: firewood, Christmas trees, boughs, and surface rock. It is suitable for the removal of other non-forest products for personal use (e.g., huckleberries, mushrooms).
- 04 The Coram Experimental Forest is not suitable for livestock grazing.
- 05 The Coram Experimental Forest is suitable for wheeled motorized and mechanized transport on designated roads and trails.
- 06 Suitability for motorized over-snow vehicle use is mapped in figure B-11.

Miller Creek Demonstration Forest

Description

The approximately 4,900-acre Miller Creek Demonstration Forest was set aside in 1989 by the Flathead National Forest, and its management is the responsibility of the Forest. A memorandum of understanding between the Rocky Mountain Research Station and the Flathead National Forest clarifies the role of the two agencies regarding activities within the demonstration forest.²⁹ Research in this area began 23 years earlier, in 1966, to study the effects of prescribed fire and silvicultural treatments on regeneration and other conditions within the mixed conifer forests typical of the area. The Miller Creek Demonstration Forest was established to encourage continuing research and to recognize the value of the area for educational and demonstration purposes.

The Miller Creek Demonstration Forest is a multiple-use area and will have regularly scheduled timber harvest and active vegetation management practices (e.g., timber harvest, thinning, planting, prescribed burning) and will provide ecosystem services and a diversity of recreation opportunities. The expected intensity of vegetation management is similar to management area 6c.

Desired conditions (MA4b-MCDF-DC)

- 01 The Miller Creek Demonstration Forest serves as a demonstration and study area for researchers, educators, forest managers, and the public. Areas are provided for studies that help answer current or future management questions.
- 02 Although natural ecological processes and disturbances are present, vegetation management activities have a dominant role in affecting the composition, structure, and pattern of vegetation. These management activities trend the vegetation towards the forestwide desired conditions.
- 03 Facilities are provided that adequately support the study and education programs of the Miller Creek Demonstration Forest.

²⁹ USDA (1989), Memorandum of understanding between the Intermountain Research Station and the Flathead National Forest [re: Miller Creek Demonstration Forest], Kalispell, MT: USDA Forest Service, Flathead National Forest and USDA Intermountain Research Station, planning record exhibit # 00628.

Suitability for the Miller Creek Demonstration Forest (MA4b-MCDF-SUIT)

- 01** The Miller Creek Demonstration Forest is suitable for timber production.
- 02** The Miller Creek Demonstration Forest is suitable for salvage logging and the removal of non-timber products for commercial or personal use.
- 03** The Miller Creek Demonstration Forest is suitable for wheeled motorized travel on designated roads and trails.
- 04** Suitability for motorized over-snow vehicle use is mapped in figure B-11.

5a through 5d: Backcountry

Introduction

The backcountry management areas consist of relatively large areas characterized by an environment influenced primarily by natural ecological processes such as natural succession, fire, insects, and disease. They provide a variety of motorized and nonmotorized recreation opportunities. Trails are the primary improvements constructed and maintained for recreational users. In some areas, fire lookouts, cabins, or other structures are present as well as some evidence of management activities. There are four different backcountry management areas, which are shown in table 30.

Table 30. Acres of backcountry management areas (MAs) and description of motorized use

Backcountry MA	Motorized Use	Acres
5a	Nonmotorized year-round	149,528
5b	Motorized year-round (motorized vehicle use only on designated roads, trails, and areas)	50,002
5c	Motorized over-snow vehicle opportunities (on designated routes and areas)	107,656
5d	Motorized wheeled vehicle use on designated roads, trails, and areas from April 1 to November 30	99,854

Desired conditions (MA5-DC)

- 01** Backcountry areas provide for less developed, semiprimitive recreation opportunities with motorized travel as described in each backcountry management area.
- 02** Fire and other natural ecological processes play a major role in influencing vegetation conditions, with a relatively low level of human influence, which provides for secure wildlife habitat. Desired vegetation conditions are achieved primarily through use of fire (prescribed and wildfire) and to a lesser extent through other methods (e.g., salvage harvest, whitebark pine thinning).

Suitability for management area 5 (MA5-SUIT)

- 01** None of the backcountry areas (management areas 5a through 5d) are suitable for timber production; however, low levels of timber harvesting for multiple-use purposes, for salvage logging, and to achieve desired vegetation conditions could occur.
- 02** In all backcountry areas (management areas 5a through 5d), mechanized transport (e.g., mountain bicycles) are suitable, including mechanized transport that is configured to ride on snow (e.g., has large tires).
- 03** Management area 5a is not suitable for motorized travel.

- 04** Management area 5b is suitable for motorized travel consistent with desired recreation opportunity spectrum settings as mapped and only on designated roads, trails, and areas.
- 05** Management area 5c is not suitable for wheeled motorized travel.
- 06** Management area 5d is suitable for wheeled motorized travel from April 1 to November 30 consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas
- 07** Suitability for motorized over-snow vehicle use is mapped in figure B-11.

Management Area 6: General Forest

These general forest areas provide a wide range of multiple uses, including habitat for wildlife, commercial and non-commercial forest products, and nonmotorized and motorized recreation opportunities. Active vegetation management (such as prescribed burning, thinning, and timber harvest) and other activities would occur to achieve desired vegetation and wildlife habitat conditions.

Management area 6 is divided into three designations: 6a, 6b, and 6c. These designations display different levels of anticipated timber harvest intensity at the landscape scale, i.e., across the management area designation as a whole. Treatment prescriptions and timber volume removed at the stand level would not necessarily differ between management areas 6a, 6b, and 6c, but timber outputs across the management area are expected to differ because of various resource considerations that affect the amount of acres and/or rate of harvest over time. Analysis at the project level will determine the appropriate management intensity within a particular general forest area, based on project-level objectives and site-specific conditions.

Acres within each management area 6 designation are displayed in table 31.

Table 31. Acres of general forest management areas

General Forest management area	Acres
6a Low-intensity vegetation management	123,693
6b Medium-intensity vegetation management	297,674
6c High-intensity vegetation management	271,895

6a General Forest Low-Intensity Vegetation Management

Description

A low intensity of timber harvest is expected in management area 6a, and regularly scheduled timber harvest would not occur (it is unsuitable for timber production). Management area 6a is located in areas with a higher level of other resource considerations or site limitations that would restrict active vegetation management compared to management area 6b or management area 6c. For example, management area 6a may be within grizzly bear secure core, within high-use white-tailed deer winter habitat, in important wildlife habitat connectivity areas, in areas of low site productivity, in areas with especially high scenic values, and/or within inventoried roadless areas. In combination, these and other factors are expected to considerably limit the regularity, rate, and amount of timber harvest over time and space. Costs associated with timber harvest and other active vegetation management may be higher, including greater restrictions on road management and access.

Desired conditions (MA6a-DC)

- 01 Vegetation management activities (including timber harvest, thinning, and prescribed fire) have a role in affecting the composition, structure, and pattern of vegetation and maintaining or trending vegetation and wildlife habitat towards the desired conditions. Natural disturbances, such as unplanned fire, insects, and disease, may be present on the landscape, though influencing vegetation conditions to a lesser degree than vegetation management activities.
- 02 There are opportunities for both motorized and nonmotorized recreation opportunities, with some areas restricted by yearlong or seasonal closures to protect big game security and winter habitat, grizzly bear secure core, and/or wildlife habitat connectivity.

Suitability (MA6a-SUIT)

- 01 These areas are not suitable for timber production; however, timber harvest to achieve desired vegetation conditions and other multiple-use purposes could occur.
- 02 These areas are suitable for salvage logging and the removal of non-timber products for commercial or personal use.
- 03 These areas are suitable for wheeled motorized travel consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas.
- 04 Suitability for motorized over-snow vehicle use is mapped in figure B-11.

6b General Forest Medium-Intensity Vegetation Management

Description

A medium intensity of timber harvest is expected to occur in management area 6b, and these areas will have regularly scheduled timber harvest (suitable for timber production). Management area 6b is located in areas where other resource considerations or site limitations are expected to restrict active vegetation management to a lesser degree than in management area 6a but more than in management area 6c. For example, management area 6b includes areas within the primary conservation area for grizzly bear, within white-tailed deer winter habitat, and/or within important wildlife habitat connectivity areas. In combination, these and other factors would limit the rate and amount of timber harvest over time and space. There may be increased costs associated with timber harvest and other vegetation management activities, as well as road management and access restrictions, in comparison to management area 6c areas.

Desired conditions (MA6b-DC)

- 01 Vegetation management activities (including timber harvest, thinning, and prescribed fire) have a dominant role in affecting the composition, structure, and pattern of vegetation and maintaining or trending vegetation and wildlife habitat towards the desired conditions. Natural disturbances, such as unplanned fire, insects, or disease, have a minor influence on vegetation conditions.
- 02 There are opportunities for both motorized and nonmotorized recreation, with some areas restricted by yearlong or seasonal closures to protect big game security and winter habitat, grizzly bear secure core, and/or wildlife habitat connectivity.

Suitability (MA6b-SUIT)

- 01 These areas are suitable for timber production.

- 02** These areas are suitable for salvage logging and the removal of non-timber products for commercial or personal use.
- 03** These areas are suitable for wheeled motorized travel consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas.
- 04** Suitability for motorized over-snow vehicle use is mapped in figure B-11.
- 05** These areas are suitable for new airstrip development in desired recreation opportunity spectrum classes semiprimitive motorized and roaded natural.

6c General Forest High-Intensity Vegetation Management

Description

A higher intensity of timber harvest is expected to occur in management area 6c compared to management area 6a or management area 6b, and these areas will have regularly scheduled timber harvest (suitable for timber production). Management area 6c is located in areas where other resource considerations or site limitations are expected to restrict active vegetation treatments to a lesser degree than either 6a or 6b. For example, management area 6c may include areas located outside the NCDE primary conservation area for grizzly bear and/or within wildland-urban interface areas. In comparison to management areas 6a and 6b, the rate and amount of timber harvest over time and space would be less limited, as would road management flexibility and access. Outside the NCDE primary conservation area for grizzly bear, new road construction would facilitate timber harvest where needed and where consistent with desired conditions for other resources.

Desired conditions (MA6c-DC)

- 01** Vegetation management activities (including timber harvest, thinning, and prescribed fire) have a dominant role in affecting the composition, structure, and pattern of vegetation and maintaining or trending vegetation and wildlife habitat towards the desired conditions. Natural disturbances, such as unplanned fire, insects, or disease, have a minor influence on vegetation conditions.
- 02** Motorized and nonmotorized recreation opportunities are readily available, with some areas restricted by yearlong or seasonal closures to protect and maintain big game security and winter habitat, wildlife security, or habitat connectivity.

Suitability (MA6c-SUIT)

- 01** These areas are suitable for scheduled timber production.
- 02** These areas are suitable for salvage logging and the removal of non-timber products for commercial or personal use.
- 03** These areas are suitable for wheeled motorized travel consistent with desired recreation opportunity spectrum settings as mapped and on designated roads, trails, and areas.
- 04** Suitability for motorized over-snow vehicle use is mapped in figure B-11.
- 05** These areas are suitable for new airstrip development in desired recreation opportunity spectrum classes semiprimitive motorized and roaded natural.

Management Area 7: Focused Recreation Area

Introduction

Focused recreation areas typically feature certain types of recreation activities that take place near or at a large lake or reservoir, developed ski area or year-round resort, large campground, or trail system. Recreational use is already occurring in many of these areas, but in some cases the use would be enhanced through an emphasis on trail, road, and facility maintenance; increased visitor contact, education, and/or the development of additional recreation opportunities such as mountain bike trails, hiking trails, or boat ramps. These areas would accommodate existing as well as additional recreation growth and are intended to benefit local economies by having robust recreation settings that are responsive to changing conditions and changing use patterns and demands. This management area provides a focal point for not only existing recreation but also for new and/or enhanced recreation activities.

Focused recreation areas recognize a variety of sustainable recreation settings and opportunities throughout the year on the forest. This management area provides a wide variety of recreation opportunities, including motorized and nonmotorized uses. Opportunities for solitude and a primitive experience may be limited near roads or trails due to frequent contact with other users. Additional motorized and nonmotorized recreation opportunities not specifically designated as management area 7 are also broadly available across the Forest, such as hiking, mountain biking, and over-snow motorized uses. The suitability of some of these additional recreation opportunities is identified in the management area descriptions and displayed on associated motorized over-snow vehicle use, motor vehicle use, and district maps.

Focused recreation areas are listed in table 32 and are depicted in figures B-31 and B-32. Management direction pertinent to all management area 7 areas is included in this section. Specific management direction for each focused recreation area is provided under its associated geographic area section.

Table 32. Focused recreation areas

Focused Recreation Area	Geographic Area^a	Featured Activities	acres
Ashley Lake (two sites: north side 93 acres, south side 10 acres)	Salish Mountains	Developed recreation, including camping, fishing, and boating	103
Big Creek Campground and Work Station	North Fork	Developed recreation, including camping, boating, fishing, and hiking; youth conservation education	57
Big Mountain (includes Whitefish Mountain Resort)	North Fork and Salish Mountains	Downhill skiing, cross-country skiing, hiking, mountain biking, conservation education	4,111
Blacktail Mountain Ski Area	Salish Mountains	Downhill skiing, hiking, mountain biking,	911
Blacktail Wild Bill Trail System	Salish Mountains	Motorized trail-riding	4,966
Blacktail-Foy's	Salish Mountains	Hiking, mountain biking, horseback riding close to communities; includes Lakeside to Blacktail, and Foy's to Blacktail trails	1,027
Camp Misery Trailhead	Swan Valley	Access to Jewel Basin hiking area	330
Crystal-Cedar Area	North Fork	Dispersed nonmotorized recreation, hiking, mountain biking, horseback riding close to communities	13,395

Focused Recreation Area	Geographic Area ^a	Featured Activities	acres
Cedar Flats Off-Highway Vehicle Area	North Fork	Motorized trail-riding	2,008
Crane Mountain	Swan Valley	Mountain biking and dispersed recreation	1,023
Holland Lake Campground	Swan Valley	Developed recreation, including camping, boating, fishing, and hiking	593
Hungry Horse Off-Highway Vehicle Area	Hungry Horse	Motorized trail-riding opportunities	71
Hungry Horse Reservoir	Hungry Horse	Developed and dispersed recreation, including camping, boating, fishing, and hiking	13,113
Ingalls Mountain	Salish Mountains	Single-track wheeled motorized use on existing open roads	2,431
Krause Basin	Swan Valley	Nonmotorized trails and limited motorized trails on designated and signed routes	1,566
Lion Lake	Hungry Horse	Day-use picnic site, hiking, fishing, and swimming	99
Nordic groomed ski areas	Salish Mountains and Middle Fork	Groomed cross-country ski areas: Round Meadow, Essex, and Blacktail Mountain	3,906
Swan Lake Campground and day-use area	Swan Valley	Developed recreation, including camping, boating, fishing, and hiking	95
Tally Lake Campground	Salish Mountains	Developed recreation, including camping, boating, fishing, and hiking	159
Tally Mountain	Salish Mountains	Mountain bike loop trail opportunities	4,692
Werner-Nicola	North Fork and Salish Mountains	Dispersed nonmotorized recreation, hiking, mountain biking, horseback riding close to communities	6,392

a. See discussions of specific geographic areas in chapter 4 for additional management direction related to these focused recreation areas.

Desired conditions (MA7-DC)

These desired conditions are applicable to all focused recreation areas.

- 01** Focused recreation areas provide sustainable recreational opportunities and settings that respond to increasing recreation demand. Local communities can readily access these areas for a variety of motorized and nonmotorized experiences.
- 02** These areas provide opportunities for large groups that may have high levels of social interaction as well as for competitive and non-competitive events.
- 03** Although natural ecological processes and disturbances may be present within this management area, vegetation management activities play a role in affecting the composition, structure, and pattern of vegetation across most of these focused recreation areas. These management activities maintain or trend the vegetation and wildlife habitat towards the desired conditions.

Summary of Suitability within Management Areas and Inventoried Roadless Areas

Specific lands within the Forest will be identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan will also identify 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 CFR § 219.7 (e)(1)(v)).

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. If certain lands are identified as not suitable for a use, then that use or activity may not be authorized without a site-specific amendment to the forest plan. Prohibiting an existing or authorizing a new use requires subsequent site-specific National Environmental Policy Act analysis. Generally, the lands on the Forest are suitable for uses and management activities appropriate for national forests, such as outdoor recreation or timber, unless identified as not suitable.

Table 34 lists the management areas, and table 35 lists some of the suitable activities that may be allowed to move towards or maintain desired conditions displayed by management area and inventoried roadless areas (see figures B-25 and B-26). This list is not intended as a substitute for the actual desired conditions, standards, and guidelines found in each management area. It is intended as a summary and a reference for the reader to see what activities are generally allowed within different management areas. Please refer to the direction for each management area for specific direction. *Note: Planned activities may occur in areas that are not identified as suitable under the auspices of agency policy.*

Suitability for motorized and nonmotorized recreation may be determined at three levels: (1) the broad level for motorized suitability is done through management area descriptions that describe the general suitability of the management area, (2) the desired recreation opportunity spectrum settings (refer to table 33 and figures B-13 and B-14) describe desired summer wheeled motorized suitability and winter motorized over-snow vehicle use, and (3) the recreation opportunity spectrum can be further defined through site-specific decisions to show nonmotorized and motorized suitability.

Suitability for motorized recreation is defined for summer and winter use. For summer suitability of motorized use, refer to the management areas and desired summer recreation opportunity spectrum class allocations, figures B-13 to B-14, and table 33. For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle suitability maps, figure B-11.

Table 33. Desired summer and winter recreation opportunity spectrum class suitability

Class	Wheeled Motorized Suitability	Motorized Over-Snow Vehicle Use ^a
Primitive	N	N
Semiprimitive nonmotorized	N	N
Semiprimitive motorized	Y ^b	Y
Roaded natural	Y	Y
Rural	Y	Y
Urban	Y	Y

a. Suitability for motorized over-snow vehicle use has been further refined and is reflected in the over-snow vehicle suitability maps (figures B-11 and B-12).

b. The designation of an area as suitable for motorized use does not mean motorized use is allowable everywhere in that setting (semiprimitive motorized, roaded natural, rural, or urban).

Table 34. Management areas

Code	Management Area Categories	Code	Management Area Categories
1a	Designated wilderness	5a	Backcountry nonmotorized year-round
1b	Recommended wilderness	5b	Backcountry motorized year-round
2a	Designated wild and scenic rivers	5c	Backcountry motorized over-snow vehicle opportunities
2b	Eligible wild and scenic rivers	5d	Backcountry motorized wheeled vehicle use on designated roads, trails, and areas from April 1 to November 30
3a	Administrative areas	6a	General forest low-intensity vegetation management
3b	Special areas	6b	General forest medium-intensity vegetation management
4a	Research natural areas	6c	General forest high-intensity vegetation management
4b	Experimental and demonstration forests	7	Focused recreation areas

Table 35. Suitability^a of management areas and inventoried roadless areas for specific uses or activities

Use or Activity	1a	1b	2a/2b Wild	2a/2b Scenic/Rec	3a/3b	4a	4b	5a	5b	5c	5d	6a	6b	6c	7	IRAs
Timber production (scheduled on rotation basis)	N	N	N	N	N	N	Y/N	N	N	N	N	N	Y	Y	Y/N	N
Timber harvest allowed	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y/N
Commercial use—special forest products and firewood	N	Y	N	Y	N	N	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y/N
Personal use—special forest products and firewood	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Removal of salable mineral materials	N	N	N	Y	Y/N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Grazing allotments	N	N	N	N	Y/N	N	Y	N	N	N	N	Y	Y	Y	N	Y
New facilities	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y/N
Wheeled motor vehicles	N	N	N	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y
Mechanized transport (e.g., mountain bike)	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
New airstrip	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N
Road construction (permanent)	N	N	N	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	N
Road reconstruction	N	N	N	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	N
Use of wildland fire to meet desired conditions	Y	Y	Y	Y	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

a. Y = yes, N = no, Y/N = potentially, in some areas; see specific management area section for clarification.

Chapter 4. Geographic Area Direction

Introduction

Geographic area management direction is specific to an area or place, such as a river basin or valley, and reflects community values and local conditions within the area. The direction does not substitute for or repeat forestwide desired conditions. These desired conditions allow the Forest to focus on specific circumstances in specific geographic locations. Geographic areas define a landscape that people associate with the Forest. Identifying these areas gives us the opportunity to direct management to better respond to local conditions and situations. The Forest has been divided into the following six geographic areas (see figure 2 below):

- Hungry Horse (HH)
- Middle Fork of the Flathead (MF)
- North Fork of the Flathead (NF)
- Salish Mountains (SM)
- South Fork of the Flathead (SF)
- Swan Valley (SV)

Geographic areas provide a means for describing conditions and trends at a more local scale if appropriate. Geographic areas are ecological areas that are synonymous with basin and watershed. Table 36 displays geographic area acreage and percentage of each geographic area in NFS lands.

Table 36. Acres within the six geographic areas on the Forest

GA	Total acres all ownerships	Forest acres	Percent of geographic area in NFS lands
Hungry Horse	331,752	286,234	86
Middle Fork	375,354	370,156	99
North Fork	389,682	320,044	82
Salish Mountains	836,805	262,859	31
South Fork	790,585	789,074	100
Swan Valley	533,139	364,440	68
Total acres	3,257,317	2,392,807	73

The geographic area section on the following pages provides an overview of the area, including unique characteristics, and geographic area desired conditions that are not necessarily covered by forestwide or management area desired conditions. Geographic area objectives, and in some cases standards and guidelines, are also specified. Maps of each geographic area can be found in appendix B. The geographic area maps shows management area allocation (figures B-19 to B-24). Descriptions of the management areas can be found in chapter 3. Information on the potential vegetation types referred to in each geographic area description, and the proportion within each geographic area, can be found in appendix D.

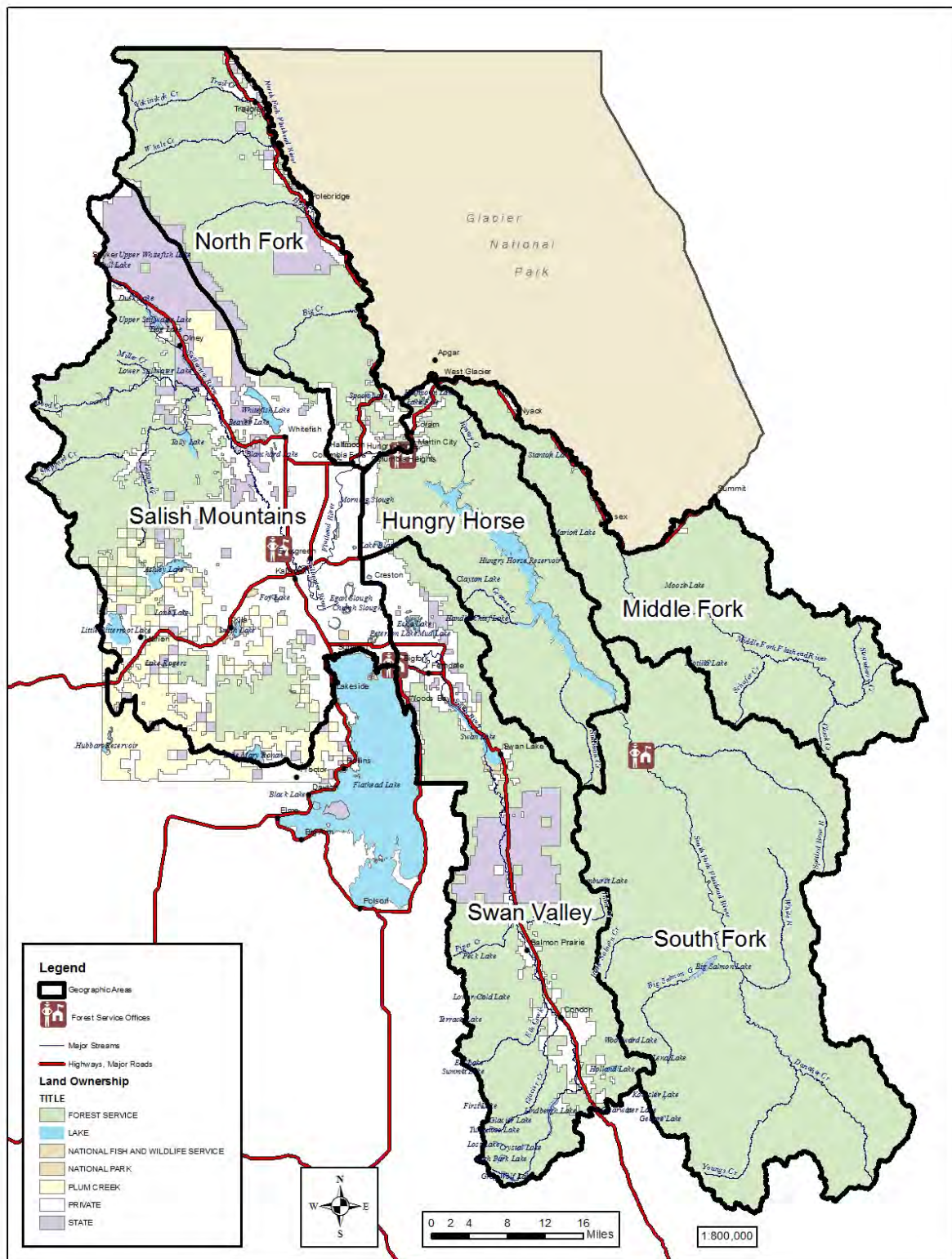


Figure 2. The six geographic areas on the Flathead National Forest

Hungry Horse Geographic Area

General overview

The Hungry Horse geographic area encompasses the lower half of the South Fork of the Flathead River basin, bordered by the Middle Fork of the Flathead River to the north and dropping over the Swan Ridge to extend down to the Flathead Valley. The vast majority is NFS lands, with private lands primarily along the far north and east boundaries along the Highway 2 corridor and adjacent to the Flathead Valley. Portions of the Great Bear Wilderness lie within this geographic area. Portions of the Hungry Horse-Glacier View and Spotted Bear Ranger Districts lie within this geographic area.

Steep mountain slopes dissected by narrow stream channels characterize much of this geographic area. The Hungry Horse Reservoir is a primary feature within this geographic area. Elevations range from 3,200 feet near the town of Hungry Horse to well over 8,000 feet on the highest mountain peaks. The vast majority of the geographic area is covered by forests of the cool-moist potential vegetation type. A small amount of cold, warm-moist, and warm-dry types also occur. For a map of the potential vegetation types for the Hungry Horse geographic area, see figure B-04. Refer to appendix D for a description and acreages of the potential vegetation types within this geographic area.

The Hungry Horse Reservoir provides the focal point for many of the recreation activities that are popular in this area, including boating, fishing, camping, hiking, and driving for pleasure on the open loop road that surrounds the reservoir. More primitive recreational activities are also popular in the wilderness and large, roadless areas of the geographic area. Timber production has also been a primary use within this geographic area. The crest of the Swan Range runs north-south and provides limited motorized recreation in a semiprimitive setting. The section of Highway 2 between Hungry Horse and West Glacier is one of the gateways to Glacier National Park. This corridor has high use during the summer.

Unique characteristics

- Contains the Hungry Horse Dam and Reservoir on the South Fork of the Flathead River. The dam, completed in 1953, impounds a reservoir that is 35 miles long and covers over 23,500 acres.
- A popular 110-mile-long driving loop around the Hungry Horse Reservoir provides access to areas of the reservoir and opportunities for driving for pleasure.
- The area has a high-quality fishery with a healthy bull trout population and an intact native fish assemblage; except for grayling, no non-native fish are present.
- Most of the approximately 15,315-acre Jewel Basin hiking area lies within this geographic area, and contains hiking trails without motorized, mechanized, or stock use.
- The Swan Crest Trail (Alpine #7) provides a long stretch of trail on a high mountain ridge.
- The Coram Experimental Forest is in this geographic area and has been set aside for forest and ecological research purposes. Embedded in this experimental forest is the Coram Research Natural Area.
- Hungry Horse Dam Visitor Center, operated by the U.S. Bureau of Reclamation, provides an opportunity for cooperative interpretation of Hungry Horse Reservoir and the surrounding environment.

Table 37 displays the acres and percentages identified for each management area in the Hungry Horse geographic area. In some instances, management area allocations overlap; e.g., an area that is management area 1a, designated wilderness, may also be 2a, a designated wild and scenic river. In this

table, the allocation of acres is listed under all assigned management areas even if an overlap occurs (in other words, as actual accounting). Refer to figure B-19.

Table 37. Hungry Horse geographic area management area actual allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	20,562	7%
1b Recommended wilderness	15,960	6%
2a Designated wild and scenic rivers	748	< 1%
2b Eligible wild and scenic rivers	4,210	1%
3a Administrative areas	202	< 1%
3b Special areas	—	—
4a Research natural areas	876	< 1%
4b Experimental and demonstration forests	7,478	3%
5a Backcountry nonmotorized year-round	34,152	12%
5b Backcountry motorized year-round, motorized vehicle use only on designated routes/areas	31,131	11%
5c Backcountry motorized over-snow vehicle use	46,021	16%
5d Backcountry motorized summer, wheeled vehicle use only on designated routes/areas	530	< 1%
5a-5d Backcountry total	111,833	39%
6a General forest low-intensity vegetation management	38,069	13%
6b General forest medium-intensity vegetation management	69,504	24%
6c General forest high-intensity vegetation management	6,838	2%
6a-6c General forest total	114,411	40%
7 Focused recreation areas	13,276	5%

a. Some management areas overlap. For example, management area 1a designated wilderness may have an overlapping management area 2a designated wild and scenic river. Due to dual designations, acreage and percentage totals will be greater than the actual land base.

Desired conditions (GA-HH-DC)

- 01** Non-native aquatic species are not present in this geographic area except for grayling in Handkerchief Lake.
- 02** Winter big game habitat (determined in cooperation with MFWP), in the area from Firefighter Mountain to Abbott Bay and in the Lion Lake area, provides desired winter habitat conditions, including snow intercept cover for big game species.
- 03** The Coram connectivity area (see figure B-30) provides habitat connectivity for a north-south movement corridor for wide-ranging species (e.g., grizzly bear, Canada lynx, wolverine) moving between the southern and northern watersheds on the Forest.
- 04** The Lost Johnny and Six Mile areas (see figure B-12) provide quality motorized over-snow vehicle opportunities, including late-season opportunities.

Standards (GA-HH-STD)

- 01** Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 38, and all snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the

minimum levels in each column of table 38 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 15 inches d.b.h., decayed/decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 38. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas^a

Forest dominance type	Potential vegetation type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 15 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	4	2
All except lodgepole pine	Warm-moist	7	2
All except lodgepole pine	Cool-moist	5	2
All except lodgepole pine	Cold	4	1
Lodgepole pine	All	2	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags or decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Hungry Horse management area 7 focused recreation direction

Suitability (GA-HH-MA7-SUIT)

- 01** The following management area 7 areas are suitable for timber production: Hungry Horse Reservoir *excluding the developed recreation sites*.
- 02** The following management area 7 areas are not suitable for timber production: developed campgrounds and day-use areas within Hungry Horse Reservoir management area 7; the Hungry Horse Off-Highway Vehicle Track; and Lion Lake. Timber harvest or other vegetation management activities may occur to achieve desired conditions for vegetation or for other multiple-use purposes associated with the area (such as public safety and health).
- 03** For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle suitability maps, figures B-11.

Hungry Horse Reservoir (GA-HH-MA7-Reservoir)

This management area 7 area surrounds the 35-mile-long Hungry Horse Reservoir and consists of a band that extends 0.25 to 0.75 mile from the shoreline, frequently bordering the main road that encircles the reservoir (NFS Roads 38 and 895). These two roads also access the Spotted Bear Ranger District, the South Fork of the Flathead Wild and Scenic River, and trailheads leading into the Bob Marshall and Great Bear Wilderness Areas. These roads are commonly called the Hungry Horse Reservoir loop road, which is a popular scenic loop drive, and they access several boat launch sites and numerous developed campgrounds and dispersed sites that provide over 250 campsites for visitors.

The recreation opportunity spectrum is roaded natural for summer and semiprimitive motorized for the winter season. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Semiprimitive provides backcountry skiing and snowmobiling opportunities where routes are typically ungroomed but are often signed and marked. Occasionally, historic cabins are available for short breaks or overnight use.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6b in locations outside developed recreation sites. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-HH-MA7-Reservoir-DC)

- 01** The Hungry Horse Reservoir area provides a diverse spectrum of recreational experiences, including boating, camping, fishing, hunting, berry picking, photography, cabin rental, driving for pleasure, and viewing of scenery and wildlife. Visitor facilities range from developed fee sites to dispersed (non-fee) sites, with undeveloped areas interspersed between existing camping areas.
- 02** The southern end of Hungry Horse Reservoir emphasizes dispersed recreation and has some developed sites that provide boat and vehicle access to the reservoir. Some dispersed recreation sites provide group camping opportunities.
- 03** The north end of Hungry Horse Reservoir emphasizes recreational development that accommodates higher use levels at concentrated developed sites, including boat launches.
- 04** Dispersed recreation sites in the Hungry Horse Reservoir area, along the shoreline and on islands, have minimal impacts to shoreline vegetation and meet health and safety requirements.
- 05** Motorized and nonmotorized water-based recreation opportunities have sufficient reservoir access points along Hungry Horse Reservoir for users to access the reservoir.
- 06** Water-based outfitters and guides and livery services provide water-based outfitting experiences for the public on Hungry Horse Reservoir.
- 07** The loop road around Hungry Horse Reservoir provides opportunities for driving for pleasure, offers vistas for viewing the reservoir and surrounding landscape, and allows for passenger vehicles to travel in a moderate degree of user comfort and convenience. Some sections of roads are paved or dust abated.
- 08** Hungry Horse Reservoir provides angling opportunities for bull trout and supports an intact native fish assemblage.
- 09** Winter recreation opportunities are provided at the Anna Creek Rental Cabin.

Objectives (GA-HH-MA7-Reservoir-OBJ)

- 01** Improve one to five campgrounds.
- 02** Complete two to five vista-enhancement projects along Hungry Horse Reservoir.
- 03** Construct one to three boat launches on the southern end of Hungry Horse Reservoir, providing access to the South Fork of the Flathead River.

Hungry Horse Off-Highway Vehicle Area (GA-HH-MA7-OHV)

This management area 7 encompasses an area adjacent to the town of Hungry Horse, Montana, that is available yearlong for motorized vehicles less than or equal to 50 inches wide. The area has about two miles of motorized routes, including a concentration of trails in a 5-acre area that provide steep inclines, sharp turns, and other challenge features.

The recreation opportunity spectrum is roaded natural for both the summer and winter season. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system.

Desired conditions (GA-HH-MA7-OHV Area-DC)

- 01** The Hungry Horse Off-Highway Vehicle Area provides day-use summer and winter motorized opportunities close to local communities as well as opportunities for day-use special-use events.

Lion Lake (GA-HH-MA7-Lion)

This approximately 40-acre lake is located only 1.5 miles from the town of Hungry Horse, Montana, and has two day-use sites. It is a very popular site for swimming, nonmotorized boating, and picnicking. A hiking trail encircles the lake.

The recreation opportunity spectrum setting is roaded natural for both the summer and winter seasons. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system.

Desired condition (GA-HH-MA7-Lion-DC)

- 01** Lion Lake and its facilities provide quality day-use, water-based recreational experiences in a natural setting close to local communities.

Objective (GA-HH-MA7-Lion-OBJ)

- 01** Construct an accessible day-use fishing platform on Lion Lake.

Middle Fork Geographic Area

General overview

The Middle Fork geographic area encompasses most of the Middle Fork of the Flathead River Basin and is bordered to the north by Glacier National Park, which contains the remaining part of the river basin. The east boundary of the geographic area follows the crest of the Continental Divide, adjacent to the Lewis and Clark National Forest. The Great Bear Wilderness and a portion of the Bob Marshall Wilderness make up the vast majority of this geographic area, and the geographic area is largely wild and undeveloped. Only about 1 percent of the geographic area is non-NFS land. This geographic area encompasses portions of the Hungry Horse-Glacier View and Spotted Bear Ranger Districts.

Rugged, remote terrain, including high, jagged mountain peaks (most reaching 7,000 or more feet in elevation) encasing moist cirque basins and steep mountain slopes dissected by narrow stream channels, characterize much of the area. Cool-moist and cold potential vegetation types cover the vast majority of this geographic area. Very little to no warm-moist or warm-dry types are present. For a map of the potential vegetation types for the Middle Fork geographic area, see figure B-05. Refer to appendix D for a description and acreages of the potential vegetation types within this geographic area.

The U.S. Highway 2 corridor, on the northern boundary of this geographic area, is a busy area separating Glacier National Park on the north and the Great Bear Wilderness on the south. This corridor includes heavy recreational use on the Middle Fork River, heavy recreational and general traffic on the highway, the Burlington Northern Santa Fe Railway line, a natural gas line, electrical transmission lines, and other utility and communications facilities. The geographic area is popular for recreational use and is a focal point for hiking, horseback riding, hunting, fishing, and river float trips on the Middle Fork of the Flathead Wild and Scenic River. Outfitting and guiding opportunities exist for many activities. Snowmobiling is popular in the Skyland Creek area near Marias Pass. Cross-country skiing and snowshoeing are also popular activities.

Unique characteristics

- The area has some of the highest densities of grizzly bears in the lower 48 states and is key grizzly bear habitat.
- The area has a high-quality fishery with a healthy bull trout population.
- The Middle Fork of the Flathead River, a designated wild and scenic river, is a free-flowing river that originates in the Bob Marshall Wilderness and provides whitewater experience.
- Schafer Meadows is a historical facility that operates seasonally. This facility, along with several backcountry guard stations and an intricate trail system, make up the Flathead National Forest Backcountry Administrative Facilities Historic District.
- The geographic area contains the Schafer Meadows Airstrip, the only open airstrip within the Bob Marshall Wilderness Complex. Livery service is permitted to the Schafer Meadows Airstrip. Soils are highly unstable in the Puzzle/Morrison Creek areas, which are east of the Lewis Overthrust. Mass failures are more common in this area than other parts of the Forest.

Table 39 displays the acres identified for each management area in the Middle Fork geographic area.

Table 39. Middle Fork geographic area management area allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	305,126	78%
1b Recommended wilderness	14,218	4%
2a Designated wild and scenic rivers	17,996	5%
2b Eligible wild and scenic rivers	10,581	3%
3a Administrative areas	—	—
3b Special areas	—	—
4a Research natural areas	—	—
4b Experimental and demonstration forests	—	—
5a Backcountry nonmotorized year-round	6,686	2%
5b Backcountry motorized year-round, motorized vehicle use only on designated routes or areas	—	—
5c Backcountry motorized over-snow vehicle use	17,996	5%
5d Backcountry motorized summer, wheeled vehicle use only on designated routes or areas	—	—
5a-5d Backcountry total	24,682	6%
6a General forest low-intensity vegetation management	13,614	3%
6b General forest medium-intensity vegetation management	5,541	1%
6c General forest high-intensity vegetation management	1,578	< 1%
6a-6c General forest total	20,733	5%
7 Focused recreation areas	163	< 1%

a. Some management areas overlap. For example, management area 1a, designated wilderness, may have an overlapping management area 2a, designated wild and scenic river. Due to dual designations, acreage and percentage totals will be greater than the actual land base.

Desired conditions (GA-MF-DC)

- 01** The lower Middle Fork of the Flathead Wild and Scenic River corridor (from Bear Creek to Blankenship) is managed in cooperation with Glacier National Park to protect its outstandingly remarkable values. Management of infrastructure (e.g., pipelines, railroad, gas lines, highway) within the wild and scenic river corridor is coordinated with Glacier National Park.
- 02** The Challenge-Skyland groomed trail and area (see figure B-12) provide quality motorized over-snow vehicle recreational opportunities, including a late-season motorized over-snow vehicle use area.
- 03** Safe winter parking opportunities and access to NFS lands and trailheads off U.S. Highway 2 are provided in conjunction with support from partners (e.g., Montana Department of Transportation, Izaak Walton Inn, and Burlington Northern Santa Fe Railway).
- 04** The Nyack Pinnacle, Essex, and South Glacier connectivity areas (see figure B-30) provide habitat connectivity for wide-ranging species (e.g., grizzly bear, Canada lynx, wolverine) moving north-south between Glacier National Park and the Bob Marshall Wilderness and east-west within the Middle Fork watershed.
- 05** Emergency disaster response is implemented cooperatively with Burlington Northern Santa Fe Railway and other cooperators to protect the Middle Fork of the Flathead River corridor and associated resources.

- 06** The Flathead National Forest Backcountry Administrative Facilities Historic District adjacent to and within the Bob Marshall and Great Bear Wilderness Areas provides national and regional recognition of wilderness and land management history.

Objectives (GA-MF-OBJ)

- 01** Acquire one or more parcels and/or provide one or more easements for wildlife crossings along Highway 2 and the Burlington Northern Santa Fe Railway corridor in the Nyack Pinnacle and Essex connectivity areas (see figure B-30).

Standards (GA-MF-STD)

- 01** The Schafer Meadows Airstrip provides public and administrative access for small aircraft, not exceeding 550 landings annually.
- 02** Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 40. All snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the minimum levels in each column of table 40 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 15 inches d.b.h., decayed or decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 40. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas.^a

Forest dominance type	Potential vegetation type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 15 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	4	2
All except lodgepole pine	Warm-moist	7	2
All except lodgepole pine	Cool-moist	5	2
All except lodgepole pine	Cold	4	1
Lodgepole pine	All	2	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags or decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are

deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Suitability (GA-MF-SUIT)

- 01 For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle suitability maps, figure B-11.
- 02 A portion of the Middle Fork geographic area is withdrawn from mining and mineral leasing laws, subject to valid and existing rights per the North Fork Watershed Protection Act of 2013.³⁰ See figure B-29.

Middle Fork management area 7 focused recreation direction

Suitability (GA-MF-MA7-SUIT)

- 01 Management area 7 Nordic groomed ski areas are suitable for timber production.
- 02 Management area 7 Nordic groomed ski areas are suitable for wheeled motorized travel on designated roads, trails, and areas.

Essex Nordic groomed ski area

This is one of three management area 7 areas on the Forest that focuses on Nordic ski opportunities. This area provides about 20 miles of groomed ski trails on an approximately 163-acre area adjacent to the town of Essex, Montana, and about 28 miles east of West Glacier, Montana, on U.S. Highway 2. The recreation opportunity spectrum setting is roaded natural for the summer and semiprimitive motorized during the winter season, primarily because motorized groomers are used to groom Nordic trails and this area is close to the highway and railroad. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Semiprimitive motorized provides opportunities for exploration and challenge in winter in the backcountry.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6b. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-MF-MA7-EssexNordic-DC)

- 01 The Essex area provides high-quality groomed Nordic skiing and snowshoeing opportunities for the public that are easily accessed from local communities.

³⁰ Section 3063 of the Buck McKeon National Defense Authorization Act, the North Fork Federal Lands Withdrawal Area, was enacted fiscal year 2015.

North Fork Geographic Area

General overview

The North Fork geographic area lies within the North Fork of the Flathead River Basin and encompasses all the lands on the west side of the river. Lands on the east side of the river are managed by Glacier National Park. The headwaters of the North Fork of the Flathead River lie in Canada to the north. The crest of the Whitefish Range forms the west boundary of this geographic area, with the highest peaks reaching close to 8,000 feet in elevation. The northwestern boundary of this geographic area is adjacent to the Kootenai National Forest. The southern boundary of this geographic area extends down to about 3,000 feet in elevation and borders the Middle Fork of the Flathead River and the town of Columbia Falls, Montana. Private and State landholdings are dispersed from the southern end of this geographic area north to the Canadian border, concentrated in the regions of gentler terrain nearest the river and nearest the town of Columbia Falls. The geographic area includes the approximately 20,000-acre Coal Creek State Forest. This geographic area includes portions of the Hungry Horse-Glacier View Ranger District.

Steep mountain slopes bisected by narrow stream channels characterize most of this geographic area. South of the Canadian border, the North Fork is generally wide, with large areas of rolling terrain and terraces bordering the Flathead River valley bottom, narrowing at its southernmost end. The cool-moist potential vegetation type covers the great majority of this geographic area. Most of the remaining land is high elevation and of the cold potential vegetation type. A good representation of sites in the warm-moist potential vegetation type occurs in the far southern end of the geographic area. Almost no warm-dry sites occur in the geographic area. For a map of the potential vegetation types, see figure B-06, and refer to appendix D for a description and acreages of the potential vegetation types within this geographic area.

The combination of large inventoried roadless areas and proximity to Glacier National Park influences the kinds of uses that this area has traditionally received. Recreational activities are popular, ranging from backcountry nonmotorized uses to high-quality motorized over-snow vehicle opportunities. Timber production has been a major activity in portions of this geographic area. The small communities of Polebridge and Hungry Horse are also within this geographic area.

Unique characteristics

- The North Fork of the Flathead River is one fork of the designated Flathead Wild and Scenic River, a free-flowing river that originates in Canada and is managed cooperatively with Glacier National Park.
- The area contains seven significant wetland complexes, some of the least-impacted wetlands in the Flathead River watersheds on the Forest.
- The historic Big Creek Work Center is currently occupied by Glacier Institute, which provides environmental education in cooperation with the Forest Service and other resource management agencies.
- The cabin and lookout rental program provides a popular recreation option for visitors, and it includes six historic Forest Service cabins.
- The area has some of the highest densities of grizzly bears in the lower 48 states and is key grizzly bear habitat.
- The area shares a border with Glacier National Park and an international border with Canada referred to as the Transboundary Flathead. The area provides essential terrestrial and aquatic connectivity for

fish and wildlife species across the international border as part of an acknowledged "international wildlife corridor."

- The area contains Tuchuck Research Natural Area, which is a reference habitat for the subalpine larch/subalpine fir habitat type.
- A portion of the Whitefish Mountain Resort is within this geographic area.

Table 41 displays the acres identified for each management area in the North Fork geographic area.

Table 41. North Fork geographic area management area allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	–	–
1b Recommended wilderness	79,821	24%
2a Designated wild and scenic rivers	6,944	2%
2b Eligible wild and scenic rivers	10,728	3%
3a Administrative areas	–	–
3b Special areas	–	–
4a Research natural areas	2,050	1%
4b Experimental and demonstration forests	–	–
5a Backcountry nonmotorized year-round	66,690	20%
5b Backcountry motorized year-round, wheeled vehicle use only on designated routes/areas	262	< 1%
5c Backcountry motorized over-snow vehicle use	11,209	3%
5d Backcountry wheeled motorized vehicle use only on designated routes/areas	–	–
5a-5d Backcountry total	78,160	24%
6a General forest low-intensity vegetation management	45,377	14%
6b General forest medium-intensity vegetation management	82,345	25%
6c General forest high-intensity vegetation management	914	< 1%
6a-6c General forest total	128,637	39%
7 Focused recreation areas	19,806	6%

a. Some management areas overlap. For example, management area 1a, designated wilderness, may have an overlapping management area 2a, designated wild and scenic river. Due to dual designations, acreage and percentage totals will be greater than the actual land base.

Desired conditions (GA-NF-DC)

- 01** Motorized over-snow vehicle use opportunities exist in designated areas in the McGinnis, Deep, and Lookout Creek areas.
- 02** Designated motorized over-snow vehicle use areas remain on the landscape to continue to provide over-snow opportunities.
- 03** The North Fork Road has vistas and vehicle pullouts for viewing Glacier National Park and the North Fork of the Flathead River.
- 04** A system of mountain bike trails provides alpine riding opportunities in the Whitefish Range.
- 05** The North Fork of the Flathead Wild and Scenic River corridor is managed in cooperation with Glacier National Park to protect its outstandingly remarkable values.

- 06 The Haskill Basin connectivity area (see figure B-30) provides habitat connectivity for wide-ranging wildlife species (e.g., grizzly bear, Canada lynx, wolverine) moving north-south between the Swan Range and the Whitefish Range.
- 07 The North Fork and North Whitefish Range connectivity areas (see figure B-30) provide habitat connectivity for wide-ranging wildlife species (e.g., grizzly bear, Canada lynx, wolverine) moving between Glacier National Park and the Whitefish Range.
- 08 Winter habitat for big game species (determined in cooperation with MFWP) from lower Big Creek to Polebridge, Montana, provide desired winter habitat conditions, including snow intercept cover for big game species.
- 09 Migratory bull trout and westslope cutthroat trout populations exist, and transboundary agreements with Canada protect water quality to sustain these important native fish.
- 10 Canyon Creek groomed trail (including late-season use), Big Mountain, and Big Creek provide quality motorized over-snow vehicle use and include snowmobiling experiences offered by outfitters and guides.
- 11 Red Meadow Road and Trail Creek Road provide access, including emergency egress, across the Whitefish Divide.

Objectives (GA-NF-OBJ)

- 01 Complete one vista enhancement and vehicle pull-out project.
- 02 Complete one to three trails that provide for mountain bike opportunities in the Whitefish Range vicinity.
- 03 Acquire one or more parcels and/or provide one or more easements for wildlife crossings along Highway 2 (Badrock Canyon), the North Fork Road (NFS Road 486), and/or the Burlington Northern Santa Fe Railway corridor.
- 04 Improve one to two campgrounds.

Standards (GA-NF-STD)

- 01 Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 42. All snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the minimum levels in each column of table 42 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 15 inches d.b.h., decayed or decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 42. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas.^a

Forest dominance type	Potential vegetation type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 15 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	4	2
All except lodgepole pine	Warm-moist	7	2
All except lodgepole pine	Cool-moist	5	2
All except lodgepole pine	Cold	4	1
Lodgepole pine	All	2	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags/decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Suitability (GA-NF-SUIT)

- 01 The North Fork Geographic Area is suitable for motorized travel on designated routes and areas.
- 02 For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle suitability map, figures B-11.
- 03 The North Fork geographic area is withdrawn from mining and mineral leasing laws, subject to valid and existing rights, per the North Fork Watershed Protection Act of 2013³¹ (refer to figure B-29).

North Fork management area 7 focused recreation direction

Suitability (GA-NF-MA7-SUIT)

- 01 The following management area 7 areas are suitable for timber production: Cedar Flats Off-Highway Vehicle Area; portions of Crystal-Cedar; and portions of Werner-Nicola. Refer to figure B-31.
- 02 The following management area 7 areas are not suitable for timber production: Big Mountain; Big Creek Campground and Work Station; portions of Crystal-Cedar; and portions of Werner-Nicola.

³¹ Section 3063 of the Buck McKeon National Defense Authorization Act, the North Fork Federal Lands Withdrawal Area, was enacted fiscal year 2015.

Refer to figure B-31. Timber harvest or other vegetation management activities may occur to achieve desired conditions for vegetation or for other multiple-use purposes associated with the area (such as public safety and health).

Big Creek Campground and Work Station

This management area 7 encompasses both the Big Creek Campground and the adjacent work station, a historic Flathead National Forest ranger station. The Big Creek campground lies adjacent to the North Fork of the Flathead River, within the wild and scenic river corridor. The Big Creek Outdoor Education Center is located at the Big Creek Work Station, where the Glacier Institute, a private non-profit under a permit with the Forest Service, has provided field-based educational experiences for over 20 years. The recreation opportunity spectrum setting for the Big Creek Campground and Work Station is roaded natural for both the summer and winter season, which provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system.

Desired conditions (GA-NF-MA7-Big Creek-DC)

- 01** Big Creek Work Station provides a base for facilitated conservation and environmental education on NFS lands, in partnership with nongovernmental organizations.

Big Mountain (GA-NF-MA7-Big Mtn)

This management area 7 is located in both the North Fork and the Salish Mountains geographic areas. Plan components are located in the Salish Mountains geographic area section.

Crystal-Cedar Area

This area is located close to the towns of Columbia Falls and Kalispell, Montana, and offers a variety of frontcountry summer and winter recreational opportunities, including dispersed camping, hiking, mountain biking, snowshoeing, and Nordic skiing. The desired recreation opportunity spectrum setting is roaded natural for the summer and a mixture of roaded natural, semiprimitive motorized, and semiprimitive nonmotorized settings. The roaded natural setting provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. The semiprimitive motorized winter setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional vast areas for traveling cross-country. The winter semiprimitive nonmotorized setting provides opportunities for solitude for those accessing the Forest on skis, snowshoes, or snowboards. Trails are ungroomed and often not marked. Rustic facilities such as historic cabins and yurts may exist but are rare.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6a (the western portion of the area) or management area 6b (the eastern portion of the area), refer to figures B-33. Refer to management area 6a or 6b for vegetation management direction.

Desired conditions (GA-NF-MA7-Crystal-Cedar-DC)

- 01** Recreational opportunities within the Crystal-Cedar Area provide a diversity of year-round recreational activities that are close to local communities.

Cedar Flats Off-Highway Vehicle Area

This management area 7 is located close to the town of Columbia Falls, Montana, and primarily offers summer motorized use on designated routes (5 miles); other activities include biking, hiking, Nordic skiing, and snowshoeing. The recreation opportunity spectrum setting is roaded natural for both the summer and winter. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system.

Opportunities for expansion of routes within the management area 7 area exist if compatible with other resource needs.

Vegetation management activities occur in order to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as for management area 6b. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-NF-MA7-Cedar Flats OHV-DC)

- 01 The Cedar Flats Off-Highway Vehicle Area provides a system of mechanized and motorized trails for mountain biking and off-highway vehicles on designated routes linking local communities to easily accessed recreation opportunities.

Werner-Nicola

This area is located northwest of Whitefish Mountain Resort and offers a variety of frontcountry recreational opportunities such as hiking, dispersed camping, mountain biking, backcountry skiing, and snowshoeing. The desired recreation opportunity spectrum setting is roaded natural in the summer and a mix of semiprimitive motorized and semiprimitive nonmotorized in the winter. The semiprimitive motorized winter setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional vast areas for traveling cross-country. The winter semiprimitive nonmotorized setting provides opportunities for solitude for those accessing the Forest on skis, snowshoes, or snowboards. Trails are ungroomed and often not marked. Rustic facilities such as historic cabins and yurts may exist but are rare. See figures B-13 and B-14 for the distribution of desired recreation opportunity spectrum settings in this management area 7 area.

Vegetation management activities occur to achieve desired conditions in portions of this management area 7 area, with the expected intensity of vegetation management the same as for management area 6a (the eastern portion of the area) or 6b (the western portion of the area); refer to figure B-33. Refer to management area 6a or 6b for vegetation management direction.

Desired conditions (GA-NF-MA7-Werner-Nicola-DC)

- 01 Recreational opportunities within the Werner-Nicola Area provide a diversity of year-round recreational activities that are close to local communities.

Salish Mountains Geographic Area

General overview

The Salish Mountain geographic area lies in the relatively gently sloped, rolling terrain of the Salish Mountain range and includes most of the main Flathead River valley. NFS lands comprise 31 percent of the area, with most land in private or State ownership, including the Stillwater State Forest. Elevations are relatively low and the terrain relatively rolling when compared to the rest of the Forest, ranging from about 2,900 feet in the Flathead River valley bottom up to about 6,500 feet on the peaks that form the western boundary of the geographic area, adjacent to the Kootenai National Forest. Private ownership and Flathead Indian Reservation lands border to the south. The Tally Lake Ranger District and the portion of the Swan Lake Ranger District that lies west of the community of Lakeside, Montana, are within this geographic area.

Due to the favorable topography and relatively close proximity to human settlements, lands within this geographic area were some of the earliest to be influenced by activities such as logging, grazing, and fire suppression associated with settlement of the surrounding area by Euro-Americans in the mid to late 1800s. A wide network of roads currently exists to access private and Federal lands that have been managed primarily for timber production over the last several decades. Communities near this area include Whitefish, Kalispell, Olney, Lakeside, Marion, Kila, and Somers.

The cool-moist potential vegetation type covers the majority of the geographic area. However, nearly a quarter of the total acres on the Forest in the warm-dry potential vegetation type lie within this geographic area due to the preponderance of lower-elevation sites and generally drier soils and weather patterns. A small portion of the Forest sites in the warm-moist potential vegetation type also occur, concentrated in the north end within the Stillwater River basin. Very little high-elevation cold type occurs in this geographic area. For a map of the potential vegetation types, see figure B-07. Refer to appendix D for a description and acreages of the potential vegetation types within this geographic area.

Recreation is a major use within this geographic area, including hiking, hunting, mountain biking, motorized trail riding, horseback riding, snowmobiling, and skiing. Timber production is another major use.

Unique characteristics

- Numerous large lakes, including Tally Lake, Little Bitterroot Lake, Upper and Lower Stillwater Lakes, Ashley Lake, and Whitefish Lake, provide a variety of water-based recreational opportunities.
- Whitefish Mountain Resort and Blacktail Mountain Ski Area are popular destinations for both local residents and visitors.
- The Pete Ridge area is one of the most important white-tailed deer winter habitats in the Flathead Valley.
- The Le Beau and Little Bitterroot Research Natural Areas and Johnson Terrace are unique topographic features that harbor a diversity of plants.
- The area has seven ecologically significant wetland complexes with a diversity of plants and features.

Table 43 displays the acres identified for each management area in the Salish geographic area.

Table 43. Salish Mountains Geographic Area management area allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	–	–
1b Recommended wilderness	–	–
2a Designated wild and scenic rivers	–	–
2b Eligible wild and scenic rivers	2,599	1%
3a Administrative areas	107	< 1%
3b Special areas	331	< 1%
4a Research natural areas	5,599	2%
4b Experimental and demonstration forests	4,942	2%
5a Backcountry nonmotorized year-round	6	< 1%
5b Backcountry motorized year-round, wheeled vehicle use only on designated routes/areas	–	–
5c Backcountry motorized over-snow vehicle use	–	–
5d Backcountry wheeled motorized vehicle use only on designated routes/areas	–	–
5a-5d Backcountry total	6	< 1%
6a General forest low-intensity vegetation management	5,725	2%
6b General forest medium-intensity vegetation management	27,670	10%
6c General forest high-intensity vegetation management	193,133	73%
6a-6c General forest total	226,528	86%
7 Focused recreation areas	24,189	9%

a. Some management areas overlap. For example, management area 1a, designated wilderness, may have an overlapping management area 2a, designated wild and scenic river. Due to dual designations, acreages and percentage totals will be greater than the actual land base.

Desired conditions (GA-SM-DC)

- 01** Within the Flathead National Forest portion of NCDE zone 1 (including the Salish demographic connectivity area) (see figure B-10), roads and trails provide for public and administrative access to NFS lands. Grizzly bear habitat in zone 1 contributes to sustaining recovery of the grizzly bear population in the NCDE. The demographic connectivity area provides habitat that can be used by female grizzly bears and allows for bear movement between grizzly bear ecosystems.
- 02** Outside the NCDE primary conservation area and the Salish demographic connectivity area, motorized trails (single-track or off-highway vehicles) provide high-elevation loop opportunities.
- 03** In areas between the primary conservation area and the Salish demographic connectivity area, NFS lands are consolidated and conservation easements with willing landowners are supported in a manner that provides habitat connectivity and facilitates movement of wildlife. National Forest System lands in the Swift Creek-Stillwater connectivity area (see figure B-30) provide habitat connectivity for wide-ranging wildlife species (e.g., grizzly bear, Canada lynx, elk) moving between the Whitefish and Salish Mountain Ranges.
- 04** Security from motorized disturbance exists in key winter habitat areas for big game species (e.g., Pete Ridge/Pilot Knob to Tally Lake and Rogers Lake to Smith Lake areas).
- 05** Habitat security contributes to MFWP objectives for big game populations, their distribution, and types of hunter access.

- 06 Big game winter habitat (determined in cooperation with MFWP) provides desired winter habitat conditions, including snow intercept cover, in the following areas: (1) Pete Ridge, Pilot Knob, the area from Rhodes Draw to just north of Good Creek, and the Stillwater River west to Tally Lake and Lost Creek; and (2) the Porter, Mount, Truman, Emmons, Stoner, and Cramer Creek subwatersheds.
- 07 Transitory forage is available within active grazing allotments.
- 08 Haskill Basin, which is the municipal watershed for the city of Whitefish, Montana, is managed to reduce the risk of high-intensity fires that have the potential to affect water quality.

Objectives (GA-SM-OBJ)

- 01 Construct and designate approximately 1 to 4 miles of motorized trail connectors that provide high-elevation loop opportunities outside the NCDE primary conservation area and Salish demographic connectivity area, where consistent with desired recreation opportunity spectrum settings.
- 02 Construct a nonmotorized trail that connects the Whitefish Trail³² through NFS lands.
- 03 Implement vegetation treatments within the Haskill Basin (Whitefish) municipal watershed to reduce the risk of high-severity fire that could potentially affect water quality.
- 04 Acquire one or more parcels and/or provide one or more easements for wildlife crossings along U.S. Highway 93 north of Whitefish.

Standards (GA-SM-STD)

- 01 Within the Flathead National Forest portion of NCDE zone 1 *outside* the Salish demographic connectivity area (see figure B-10), there shall be no net increase above the baseline (see glossary) in the density of roads open to public motorized use on NFS lands. *Inside* the Salish demographic connectivity area, there shall be no net increase above the baseline (see glossary) in the density of roads and trails open to public motorized use during the non-denning season on NFS lands. Density is calculated by dividing the total miles open to public motorized use on NFS lands during the non-denning season, by the total square miles of NFS lands in that same area. This standard does not apply to the following:
 - motorized use by agency personnel or others authorized by the appropriate agency personnel;
 - the temporary opening of a road for a short period of time to allow for public firewood gathering and other authorized uses (see also FW-STD-IFS-04);
 - updated/improved road data without an actual change on the ground;
 - changes in technology or projections that result in changed calculations without actual change on the ground (e.g., a switch in geodetic systems from the North American Datum of 1927 to the North American Datum of 1983);
 - moving a road closure location a short distance (e.g., to the nearest intersection or turnout) to a better location to allow turn-arounds that provide for public safety, to reduce vandalism, or to improve enforcement of the road closure;

³² For additional information about this trail system, see the Whitefish Legacy Partners website, <http://whitefishlegacy.org>.

- exchanging, acquiring, buying, or selling lands by the agency;
- a change in an open road that is necessary to comply with Federal laws (e.g., the Architectural Barriers Act of 1968, as amended);
- motorized use for mining activities (as authorized under the Mining Law of 1872) and oil and gas activities (as authorized under the Federal Onshore Oil and Gas Leasing Reform Act of 1987) because these types of permitted resource development are subject to existing rights and have a separate set of standards and guidelines;
- a change in an open road that is 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);
- motorized use for emergency situations as defined by 36 CFR § 218.21;
- temporary roads (see glossary).

- 02** Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 44. All snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the minimum levels in each column of table 44 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 10 inches d.b.h., decayed or decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 44. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas.^a

Forest dominance type	Potential Vegetation Type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 10 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	9	2
All except lodgepole pine	Warm-moist	13	3
All except lodgepole pine	Cool-moist	10	2
All except lodgepole pine	Cold	10	1
Lodgepole pine	All	7	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags or decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural

diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Guidelines (GA-SM-GDL)

- 01 In order to provide elk habitat security (see glossary), access management actions should not result in a decrease in total acres of NFS lands within the geographic area that are at least 250 contiguous acres and at least 0.5 mile from routes open to wheeled motorized use by the public during the hunting season. If vegetation management occurs in elk security habitat, a mosaic of cover and forage should be provided, in consideration of the site-specific topography and vegetation types. Roads closed yearlong may be temporarily opened, after consultation with a forest wildlife specialist, for up to 30 days during July and August to allow for activities such as firewood gathering.

Salish Mountains management area 7 focused recreation direction

Note: The Werner-Nicola MA7 area is located in both the North Fork and the Salish Mountains geographic areas. Plan components are found under the North Fork geographic area section.

Suitability (GA-SM-MA7-SUIT)

- 01 The following management area 7 areas are suitable for timber production: Blacktail Mountain Nordic Ski Trail, Round Meadow Cross-Country Ski Area, Blacktail Wild Bill Trail System, Blacktail-Foy's, Tally Mountain, and Ingalls Mountain.
- 02 The following management area 7 areas are not suitable for timber production: Blacktail Mountain Ski Area, Big Mountain, Tally Lake Campground, and Ashley Lake Campground. Timber harvest or other vegetation management activities may occur to achieve desired conditions for vegetation or for other multiple-use purposes associated with the area (such as public safety and health).
- 03 These areas are suitable for motorized travel on designated roads, trails, and areas.
- 04 For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle suitability map, figure B-11.

Big Mountain (GA-SM-MA7-Big Mtn)

This management area 7 area is located in both the North Fork and Salish Mountain geographic areas. The area provides a variety of both winter and summer recreational opportunities, including downhill and Nordic skiing, snowshoeing, hiking, biking, berry picking, and snowmobiling. The Whitefish Mountain Resort permit area is within this management area. The Summit Nature Center is located at the Whitefish Mountain Resort on the top of Big Mountain and, in partnership with the resort, offers conservation education and a hands-on discovery center.

The desired recreation opportunity spectrum setting is rural for both the summer and winter season. Winter rural settings are high-use areas. Groomed motorized and nonmotorized trails offer users the chance to get outside for a day trip or to take longer, cross-country excursions. These areas are accessed from paved and plowed roads and are generally close to population centers. User comfort facilities such as toilets, restaurants, heated shelter facilities, and information and education are commonly present.

Summer rural recreation opportunity spectrum settings are high-use areas. These highly structured and hardened settings accommodate large group gatherings and serve as day-use destinations. These settings

also function as outdoor classrooms for interpretive programs and other structured learning. Roads and parking areas are generally paved, and structures and facilities provide shelter, sanitation, potable water, and other amenities.

Desired conditions (GA-SM-MA7-Big Mtn-DC)

- 01** The Canyon Creek groomed trails provide quality motorized over-snow recreation consistent with the desired recreation opportunity spectrum settings. Mixed uses of motorized over-snow vehicles and downhill skiers are compatible in the Canyon Creek area.
- 02** A quality conservation and environmental education program is provided in partnership with the Whitefish Mountain Resort.
- 03** Forest conditions within the Whitefish Mountain Resort permit area are conducive to achieving the desired recreational setting and experience for users. Forests have structure, composition, and densities that are resilient to disturbances such as fire, insects, and disease.
- 04** Year-round recreational opportunities in an alpine setting exist at the Whitefish Mountain Resort on Big Mountain. Winter recreation opportunities occur in all portions of the Whitefish Mountain Resort permit area. During the grizzly bear non-denning season, developed recreation opportunities are provided on the south-facing slope in the Whitefish Mountain Resort permit area. The portion of the upper Hellroaring watershed below Taylor Creek Road (NFS Road 9790) provides higher levels of grizzly bear habitat security.
- 05** Existing groomed motorized over-snow vehicle routes continue to provide recreation opportunities to Whitefish Mountain Resort on Big Mountain.
- 06** A connective nonmotorized trail system exists linking the Whitefish Legacy Trails to NFS lands near the summit of Big Mountain and the Whitefish Divide. New trails are designed and located to reduce the risk of grizzly bear-human conflicts.

Guidelines (GA-SM-MA7-Big Mtn GDL)

- 01** To reduce grizzly bear-human conflicts at the Whitefish Mountain Resort during the non-denning season, existing mitigation measures for grizzly bears regarding food and garbage handling, odor control, and grizzly bear education at the Summit House should be retained.

Blacktail Mountain Ski Area (GA-SM-MA7-BlacktailSki)

This management area 7 area includes the Blacktail Mountain Ski permit area, which provides downhill skiing winter recreational opportunities. The recreation opportunity spectrum setting is roaded natural in the summer season and rural in the winter season. The roaded natural setting provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Winter rural setting are high-use areas. Groomed motorized and nonmotorized trails offer users the chance to get outside for a day trip or to take longer, cross-country excursions. These areas are accessed from paved and plowed roads and are generally close to population centers. User comfort facilities such as toilets, restaurants, heated shelter facilities, and information and education are commonly present.

Desired conditions (SM-MA7-BlacktailSki-DC)

- 01** Forest vegetation conditions within the Blacktail Mountain Ski Area are conducive to achieving the desired recreational setting and experience for users.

- 02** A nonmotorized trail system exists on NFS lands to connect Blacktail Mountain to trails on adjacent ownerships (Lakeside, Montana, and Foy's Lake area).
- 03** A nonmotorized trail system that connects the community of Lakeside, Montana, to Blacktail Mountain is maintained.
- 04** Facilities at the ski area provide year-round recreation within the existing Blacktail Mountain Ski Area permit boundary.

Objectives (GA-SM-MA7-Blacktailski-OBJ)

- 01** Construct a nonmotorized trail that connects NFS lands in the vicinity of Blacktail Mountain to trails on other ownerships in the Foy's Lake area (Foy's to Blacktail Trails).

Blacktail Mountain Nordic Ski Trail (GA-SM-MA7-BlacktailNordic)

This is one of three management area 7 areas on the Forest that focuses on Nordic ski opportunities. This area provides about 17 miles of ski trails on an approximately 2,550-acre area in close proximity to the town of Lakeside, Montana. The area also provides mountain biking, hiking, wheeled motorized use, and horseback riding opportunities in the summer.

The recreation opportunity spectrum is a mixture of roaded natural and semiprimitive motorized for the summer season and a mixture of semiprimitive motorized and semiprimitive nonmotorized for the winter season. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Summer semiprimitive motorized recreation opportunity spectrum settings provide motorized recreation opportunities in backcountry settings. Routes are designed for off-highway vehicles and high-clearance vehicles. 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.

The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country. The winter semiprimitive nonmotorized setting provides opportunities for solitude for those accessing the Forest on skis, snowshoes, or snowboards. Trails are generally ungroomed and often are not marked. Rustic facilities such as historic cabins and yurts may exist but are rare.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6c. Refer to management area 6c for vegetation management direction.

Desired conditions (GA-SM-MA7-BlacktailNordic-DC)

- 01** The Blacktail Mountain Cross-Country Ski Area provides Nordic skiing and snowshoeing opportunities in the winter and recreation opportunities such as hiking, wheeled motorized use, mountain biking, and equestrian use in the summer that are close to local communities.

Blacktail Wild Bill Trail System (GA-SM-MA7-BlacktailOHV)

This area located west of Lakeside, Montana, provides about 10 miles of trails available for use by off-highway vehicles as well as for mountain biking, horseback riding, and hiking. The Blacktail Wild Bill Off-Highway Vehicle Trail was designated as a National Recreation Trail in the 1970s. It is popular with jeep and all-terrain vehicle users.

The recreation opportunity spectrum is roaded natural in the summer season and a mixture of roaded natural and semiprimitive motorized in the winter season. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6c. Refer to management area 6c for vegetation management direction.

Desired conditions (GA-SM-MA7-BlacktailOHV-DC)

- 01** The Blacktail Wild Bill Off-Highway Vehicle National Recreation Trail provides yearlong recreation opportunities close to local communities. Wheeled motorized vehicle use occurs on designated routes, with loop trails and trail connectors to the Blacktail and Truman Creek Off-Highway Vehicle Trail systems. Challenge features for off-highway vehicles are provided along a portion of the trail system.

Round Meadow Cross-Country Ski Area (GA-SM-MA7-Round Meadow)

This management area 7 area is one of three areas on the Flathead National Forest that focuses on Nordic skiing and snowshoeing opportunities. It provides about 12 miles of groomed Nordic ski trails on about 1,209 acres and is located 12 miles west of the city of Whitefish, Montana. Summer recreational opportunities include horseback riding, biking, and hiking. The recreation opportunity spectrum setting is roaded natural in the summer season and semiprimitive nonmotorized in the winter season. Roaded natural provides for a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. The winter semiprimitive nonmotorized setting provides opportunities for solitude for those accessing the Forest on skis and snowshoes. Rustic facilities such as historic cabins and yurts may exist but are rare.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6b. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-SM-MA7-Round Meadow-DC)

- 01** The Round Meadow Cross-Country Ski Area provides groomed Nordic skiing and snowshoeing opportunities in the winter and nonmotorized recreation opportunities such as hiking, mountain biking, and equestrian use in the summer.
- 02** A hut-to-hut system provides for progressive use of Forest facilities that link Round Meadow with Sylvia Lake.

Tally Lake Campground (GA-SM-MA7-Tally Lake)

This developed campground is located about 12 miles west of Whitefish, Montana, on the northern shore of Tally Lake, the second deepest lake in Montana. Camping, fishing, boating, hiking, horseback riding, biking, picnicking, and swimming are popular activities in this area. The campground has 40 campsites, a boat launch, open-air pavilion, beach area, picnic site, and water. The Tally Lake pavilion is a timber-framed open-air pavilion with parking for 50 vehicles, a vault toilet, picnic tables, fire grill, group fire ring, horse pit, volleyball court, and nature trail.

Desired conditions (GA-SM-MA7-Tally Lake-DC)

- 01 Tally Lake Campground provides a quality developed camping experience consistent with the recreation opportunity spectrum of roaded natural for both the summer and winter seasons that provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use.

Ashley Lake Campgrounds (GA-SM-MA7-Ashley Lake)

About 15 miles west of Kalispell lies Ashley Lake, an approximately 3,000-acre lake popular for water-based recreational opportunities such as boating, fishing, and swimming. The majority of the shoreline is privately owned. Public access to the lake is provided at three areas on NFS lands, with facilities for camping, boat launching, and day-use activities. There are a total of 11 campsites associated with the three public-access areas along the lake.

The recreation opportunity spectrum setting is roaded natural for both the summer and winter seasons which provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use.

Desired conditions (GA-SM-MA7-Ashley Lake-DC)

- 01 The three sites on Ashley Lake provide visitor access to a quality, water-based recreational experience. Camping opportunities complement the existing developed environment surrounding the lake.
- 02 Ashley Lake campgrounds and facilities are well maintained, have minimal damage to resources, and accommodate current use.

Objectives (SM-MA7-Ashley Lake-OBJ)

- 01 Reconstruct three developed recreation sites at Ashley Lake within the next 10 years.

Blacktail-Foy's (GA-SM-MA7-Blacktail-Foys)

This area provides summer recreational opportunities including horseback riding, mountain biking, disperse camping, and hiking. The recreation opportunity spectrum setting is roaded natural in the summer season and semiprimitive motorized in the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6c. Refer to management area 6c for vegetation management direction.

Desired conditions (GA-SM-MA7-Blacktail Foyes-DC)

- 01** Nonmotorized trails provide summer (July and August) hiking and mountain biking opportunities close to local communities, connecting the Blacktail Mountain area to trail systems located on non-Federal lands.

Tally Mountain (GA-SM-MA7-Tally Mountain)

This area provides summer recreational opportunities including horseback riding, mountain biking, disperse camping, and hiking. The recreation opportunity spectrum setting is roaded natural for the summer season and a mixture of semiprimitive motorized and semiprimitive nonmotorized for the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country. The winter semiprimitive nonmotorized setting provides opportunities for solitude for those accessing the Forest on skis and snowshoes. Trails are generally ungroomed and often not marked. Rustic facilities, such as historic cabins or yurts, may exist but are rare.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6c. Refer to management area 6c for vegetation management direction.

Desired conditions (GA-SM-MA7-Tally Mountain-DC)

- 01** Recreational opportunities within the Tally Mountain area are consistent with the desired recreation opportunity spectrum settings of roaded natural for the summer season and a mixture of semiprimitive motorized and semiprimitive nonmotorized for the winter season and provide a diversity of summer nonmotorized recreational activities.

Ingalls Mountain (GA-SM-MA7-Ingalls Mountain)

This area provides summer recreational opportunities including horseback riding, mountain biking, driving for pleasure, and motorcycle riding on single-track trails. The recreation opportunity spectrum setting is roaded natural for the summer season and semiprimitive motorized in the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well-maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country. Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6c. Refer to management area 6c for vegetation management direction.

Desired conditions (GA-SM-MA7-Ingalls Mountain-DC)

- 01** Motorized trails provide summer (July and August) wheeled motorized trail experiences on designated routes.
- 02** This area provides a high-elevation wheeled motorized loop trail.

South Fork Geographic Area

General overview

The South Fork geographic area is the largest on the Flathead National Forest and encompasses the upper half of the South Fork of the Flathead River Basin. It is bordered by the peaks of the Swan Mountain range to the west and the crest of the Continental Divide to the east, adjacent to the Lewis and Clark National Forest. This geographic area includes the vast, undeveloped area of the Bob Marshall Wilderness and portions of the Great Bear Wilderness and is highly variable in topography and elevation. Wide, gently sloped river valley bottom lands contrast with very high, rugged, and steeply sloped mountain peaks and cirque basins, with elevation ranging from 3,600 to over 8,000 feet.

These lands support a great diversity of vegetation types and outstanding habitats for native fish and wildlife species such as grizzly bears, gray wolves, and bull trout. For a map of the potential vegetation types in the South Fork geographic area, see figure B-08, and refer to appendix D for a description and acres of the potential vegetation types within this geographic area. This geographic area includes all of the Spotted Bear Ranger District and is entirely NFS lands.

This geographic area is popular for recreational use. It is a focal point for hiking, horseback riding, hunting, and fishing and for river float trips on the Wild and Scenic South Fork of the Flathead River. Many of the visitors to the wilderness utilize outfitter services, given the area's vastness and remoteness.

Unique characteristics

- The Bob Marshall Wilderness and a portion of the Great Bear Wilderness make up the majority of this geographic area. They are part of the Bob Marshall Wilderness Complex, which includes lands on the Flathead, Helena-Lewis and Clark, and Lolo National Forests. The Bob Marshall Wilderness Complex is part of one of the largest remaining wildland areas in the lower 48 states, containing world-class backcountry, and is entirely NFS lands.
- A popular 110-mile-long driving loop around Hungry Horse Reservoir provides access to areas of the reservoir and driving for pleasure opportunities.
- Very large expanses of unroaded lands characterize most of this geographic area, allowing for fire and other natural processes to play a dominant role in the ecosystem.
- The South Fork of the Flathead River from Youngs Creek to Hungry Horse Reservoir is a designated Wild and Scenic River.
- The Meadow Creek and Spotted Bear Airstrips are within this geographic area.
- Bent Flat and Trail Creek, two significant, high-quality fens located along the Spotted Bear River, harbor numerous rare wetland plant species.
- The Dry Park, Horse Ridge, lower Spotted Bear River, and Danaher to Big Prairie areas provide key winter habitat for elk and other big game species.
- Bull trout migrate from Hungry Horse Reservoir and provide catch-and-release angling that is not found elsewhere in Montana. The westslope cutthroat trout populations are non-hybridized as there are no non-native fish populations.
- Spotted Bear Ranger Station and Big Prairie guard station are historic facilities that operate seasonally. These, along with several backcountry guard stations, 40 miles of operational historic

phone line, and an intricate trail system, make up the Flathead National Forest Backcountry Administrative Facilities Historic District.

Table 45 displays the acres identified for each management area in the South Fork geographic area.

Table 45. South Fork geographic area management area allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	671,650	80%
1b Recommended wilderness	33,880	4%
2a Designated wild and scenic rivers	16,473	2%
2b Eligible wild and scenic rivers	41,735	5%
3a Administrative areas	170	< 1%
3b Special areas	—	—
4a Research natural areas	—	—
4b Experimental and demonstration forests	—	—
5a Backcountry nonmotorized year-round	31,097	4%
5b Backcountry motorized year-round, wheeled vehicle use only on designated routes and areas	—	—
5c Backcountry motorized over-snow vehicle use	12,189	1%
5d Backcountry wheeled motorized vehicle use only on designated routes/areas	—	—
5a-5d Backcountry total	43,286	5%
6a General forest low-intensity vegetation management	4,744	1%
6b General forest medium-intensity vegetation management	20,662	2%
6c General forest high-intensity vegetation management	4,678	1%
6a-6c General forest total	30,084	4%
7 Focused recreation areas	7	< 1%

a. Some management areas overlap. For example, management area, 1a designated wilderness, may have an overlapping management area 2a, designated wild and scenic river. Due to dual designations, acre and percentage totals will be greater than the actual land base.

Desired conditions (GA-SF-DC)

- 01** The 40 miles of operational historic phone line is maintained for continued use for wilderness management.
- 02** The Flathead National Forest Backcountry Administrative Facilities historic district adjacent to and within the Bob Marshall and Great Bear Wilderness Areas provides recognition of national and regional wilderness and land management history.
- 03** The Spotted Bear and Meadow Creek Airstrips provide public and administrative access for small aircraft.
- 04** Lands mapped as winter big game habitat by MFWP in the Dry Park, Horse Ridge, lower Spotted Bear River, and Danaher to Big Prairie areas provide desired winter habitat conditions.
- 05** Non-native fish populations are absent. Fishing for bull trout and westslope cutthroat trout provide for unique angling opportunities. High mountain lakes contribute to those angling opportunities.
- 06** Water-based outfitter and guide and livery services provide water-based outfitting experiences on the South Fork of the Flathead River.

Objectives (GA-SF-OBJ)

- 01 Annually, maintain 40 miles of the historic phone line.
- 02 Improve one to two campgrounds.

Standards (GA-SF-STD)

- 01 Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 46. All snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the minimum levels in each column of table 46 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 15 inches d.b.h., decayed or decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 46. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas.^a

Forest dominance type	Potential vegetation type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 15 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	4	2
All except lodgepole pine	Warm-moist	7	2
All except lodgepole pine	Cool-moist	5	2
All except lodgepole pine	Cold	4	1
Lodgepole pine	All	2	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags/decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Swan Valley Geographic Area

General overview

The Swan Valley geographic area encompasses the entire Swan River basin and also extends north into the eastern portion of the Flathead River valley and west to encompass a portion of the east shore of Flathead Lake. The Flathead Indian Reservation borders the geographic area to the west, following the shore of Flathead Lake and the Mission Mountains divide. The divide between the Swan River and Clearwater River basins forms the southern border, shared by the Lolo National Forest. The peaks of the Swan Range form the eastern border.

The Flathead River valley in the northern portion of the geographic area is mostly non-NFS land. A substantial portion (approximately 28 percent) of the Swan River watershed is also non-NFS land, about half of which is the approximately 61,000-acre Swan River State Forest. Acres in the Swan Valley in private ownership were much higher prior to 2010, when the Forest Service acquired approximately 45,000 acres of Plum Creek Timber Company lands through the Montana Legacy Project. Portions of the Swan Lake Ranger District are within this geographic area.

The Swan River watershed is characterized by a wide valley bottom of flat to rolling, gently sloped terrain that is bordered on both sides by rugged mountains jutting up steeply from the valley floor. Elevation ranges from about 3,000 feet at the mouth of the Swan River on the shores of Flathead Lake to over 8,000 feet on the highest peaks of the Swan Range and Mission Mountains. Terrain, soils, and weather patterns all contribute to the generally high precipitation and productivity of lands within the Swan Valley when compared to other regions of the Forest. The majority of the warm-moist potential vegetation types, the most productive lands that occur on the Forest, are within this geographic area. Warm-dry potential vegetation types also occur on some of the drier aspects and soil types. The high elevations of the Mission and Swan Mountain ranges support a good representation of cold potential vegetation types. For a map of the potential vegetation types for this geographic area, see figure B-09. Refer to appendix D for a description and acreages of the potential vegetation types within this geographic area.

This geographic area links the Bob Marshall Wilderness Complex and the Mission Mountains Wilderness and is an important connectivity zone for many species of wildlife, including grizzly bears. Recreation and timber management are major uses within this geographic area.

Unique characteristics

- The Mission Mountains Wilderness is within this geographic area.
- This geographic area contains Swan, Holland, and Lindbergh Lakes, which are popular day-use and camping areas.
- This geographic area contains large acreages of diverse, high-quality riparian habitats and wetlands, including on the Swan Valley floor the Forest's most extensive, floristically diverse concentration of peatlands (fens), many of which are designated as special areas (management area 3b).
- This geographic area contains most of the known populations of water howellia, a federally listed threatened plant that depends on seasonally drying ponds. Condon Creek Botanical Area supports a significant concentration of water howellia.
- The Swan Valley provides key winter habitat for big game species.
- The Swan River Research Natural Area occurs in this geographic area and is managed in partnership with the Nature Conservancy to preserve rare aquatic habitats.

- The Swan Crest Trail (Alpine #7) provides a long stretch of trail on a high mountain ridge.
- A portion of the approximately 15,315-acre Jewel Basin hiking area lies within this geographic area and contains hiking trails without motorized, mechanized, or stock use.
- The Condon Airstrip is an open, public airstrip in the Swan Valley.
- The Condon Work Center is currently operated by Swan Valley Connections under a partnership agreement with the Forest Service.

Table 47 displays the acres identified for each management area in the Swan Valley geographic area.

Table 47. Swan Valley Geographic Area management area allocation^a (acres and percent)

Management Area	acres	percent
1a Designated wilderness	74,703	20%
1b Recommended wilderness	46,524	13%
2a Designated wild and scenic rivers	—	—
2b Eligible wild and scenic rivers	10,020	3%
3a Administrative areas	10	< 1%
3b Special areas	2,178	1%
4a Research natural areas	1,345	< 1%
4b Experimental and demonstration forests	—	—
5a Backcountry nonmotorized year-round	10,638	3%
5b Backcountry motorized year-round, wheeled vehicle use only on designated routes/areas	18,609	5%
5c Backcountry motorized over-snow vehicle use	20,234	5%
5d Backcountry wheeled motorized vehicle use only on designated routes/areas	9,325	3%
5a-5d Backcountry total	58,806	16%
6a General forest low-intensity vegetation management	16,163	4%
6b General forest medium-intensity vegetation management	91,951	25%
6c General forest high-intensity vegetation management	64,754	18%
6a-6c General forest total	172,868	47%
7 Focused recreation areas	3,607	1%

a. Some management areas overlap. For example, management area 1a, designated wilderness, may have an overlapping management area 2a, designated wild and scenic river. Due to dual designations, acreage and percentage totals will be greater than the actual land base.

Desired conditions (GA-SV-DC)

- 01** Known sites and habitat for the currently threatened species water howellia (*Howellia aquatilis*) persist over time in special aquatic habitats and backwaters in larger, low-elevation valleys (see also FW-DC-PLANTS-01).
- 02** The Swan Highway (Montana Highway 83) from Swan Lake to Holland Lake has vistas for viewing the Mission Mountains and the Swan Range.
- 03** Lands acquired in the Swan Valley provide access to NFS lands by the public while maintaining and improving water quality, wildlife habitat conditions, and water howellia habitat.
- 04** Educational guided services are provided in the Mission Mountains Wilderness.

- 05 Winter habitat for big game species in the Swan Valley (determined in cooperation with MFWP), from the Holland Lake area on the south to the Swan Lake State Forest boundary on the north, provides desired winter habitat conditions, including snow intercept cover.
- 06 The size, shape, and characteristics of forest patches in the Swan Valley form a natural-appearing mosaic pattern rather than the straight-edged “checkerboard” pattern resulting from past land ownership and management practices.
- 07 Vegetation conditions across the valley bottom and foothill landscapes of the Swan Valley are highly diverse in species composition and forest structure, reflecting the conditions that would naturally be associated with this area’s unique and varied site conditions and terrain, including much of the Forest’s warm-moist potential vegetation type lands and an abundance of forest/wetland interface areas.
- 08 The extensive and floristically diverse concentration of peatlands and fens within this geographic area supports sustainable and healthy populations of the plant species or communities associated with this feature.
- 09 The portion of the Seeley Clearwater connectivity area from Condon south to the boundary of the Swan Valley geographic area and from the south end of Swan Lake to Lost and Porcupine Creeks (see figure B-30) provide habitat connectivity for wide-ranging wildlife species (e.g., grizzly bear, Canada lynx, and wolverine) moving between the Swan and Mission Mountain Ranges.
- 10 The Six Mile area provides motorized over-snow vehicle use, including late-season use (see figure B-12), as well as summer wheeled motorized use, consistent with the desired recreation opportunity spectrum.
- 11 Habitat conditions and ecological processes support known populations of the carinate mountainsnail on and adjacent to talus slopes in the Swan Valley geographic area.

Objectives (GA-SV-OBJ)

- 01 Complete one vista enhancement project along the Swan Highway (Montana Highway 83).
- 02 Improve one to three campgrounds.
- 03 Out of the total treatment acres across the Forest, treat 1,500 to 7,500 acres of young forest (e.g., sapling stands) in the Swan Valley geographic area to maintain or move towards achieving desired forest composition, structure, forest fuel conditions, landscape patterns, and scenic integrity, with a focus on the previously harvested lands recently added to the NFS.
- 04 Decommission or place into intermittent stored service 10 to 30 miles of roads. Priorities are roads causing resource damage in priority watersheds, roads on acquired lands in the Swan Valley that are not needed for fire protection or other resource management, roads within desired nonmotorized recreation opportunity spectrum settings, and/or roads within bull trout watersheds.

Standards (GA-SV-STD)

- 01 Within timber harvest areas, snags or live replacement trees shall be retained at or above the minimum levels displayed in table 48. All snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. shall be retained. If sufficient snags to meet the minimum levels in each column of table 48 are not present, live replacement trees shall be substituted for each snag. Live replacement trees shall be of the largest size present above 10 inches

d.b.h., decayed or decadent trees if present, and the following species if present: western larch, ponderosa pine, Douglas-fir, cottonwood, aspen, birch, or western redcedar. In regeneration harvest units, suitable replacement trees include those that would not cause unacceptable impacts to the conifer tree regeneration (e.g., dwarf mistletoe infection or potential dysgenic seed source).

Table 48. Minimum average number of snags or live replacement trees per acre greater than 10 feet tall to retain within timber harvest areas.^a

Forest dominance type	Potential vegetation type	Total minimum number of snags or live replacement trees per acre of the largest d.b.h. present (greater than 10 inches d.b.h.)	Minimum number of snags or live replacement trees per acre greater than or equal to 20 inches d.b.h.
All except lodgepole pine	Warm-dry	9	2
All except lodgepole pine	Warm-moist	13	3
All except lodgepole pine	Cool-moist	10	2
All except lodgepole pine	Cold	10	1
Lodgepole pine	All	7	1

a. Minimum retention levels should be analyzed and applied at the project level across individual harvest units, all units, or groups of units (e.g., grouped by potential vegetation type). An alternative analysis area for application of snag retention direction may be developed for salvage harvest in areas of very high snag densities (e.g., due to fire, severe insect or disease mortality), based on site-specific conditions and potentially including areas outside harvest units. This analysis approach recognizes the naturally uneven distribution of snags across the forested landscape, particularly of the larger, higher-quality snags or decadent trees. It allows for variation in snag retention within treatment units that is consistent with the natural distribution and with the intent of preserving the most desirable snags, decadent trees, and replacement trees.

Exceptions to the snag retention standard may occur in areas where there are issues of human health and safety (e.g., developed recreation sites, adjacent to landings). To contribute to forest structural diversity and wildlife habitat (such as for fisher or marten), snags or live replacement trees within harvest units that are designated for retention but fall down due to natural causes (e.g., wind) or are deliberately felled for reasons of human safety shall not be removed. See also FW-GDL-RMZ-10 for snag retention direction in harvest units within riparian management zones.

Guidelines (GA-SV-GDL)

- 01** To provide coordinated management of the Mission Mountains Wilderness, consultation with the Confederated Salish and Kootenai Tribes should occur prior to authorization of new outfitter and guide permits.
- 02** To protect the carinate mountainsnail, talus slopes with known populations of this invertebrate species should not be used as a gravel or ornamental rock source, and immediately adjacent vegetation should not be harvested or sprayed for non-native invasive weeds.
- 03** To maintain and protect wilderness character, Glacier, Cold, and Upper Cold Lakes should provide only day-use opportunities in the Mission Mountains Wilderness.
- 04** For efficient management of the grazing program, open and active cattle grazing allotments should be closed if the opportunity arises with a willing permittee.

Swan Valley management area 7 focused recreation direction

Suitability (GA-SV-MA7-SUIT)

- 01 The following management area 7 areas are suitable for timber production: Krause Basin and Crane Mountain.
- 02 The following management area 7 areas are not suitable for timber production: Holland Lake Campground, Swan Lake Campground and day-use area, and Camp Misery trailhead. Timber harvest or other vegetation management activities may occur to achieve desired conditions for vegetation or for other multiple-use purposes associated with the area (such as public safety and health).
- 03 These areas are suitable for wheeled motorized travel on designated roads, trails, and areas.
- 04 For suitability of winter motorized over-snow vehicle use, refer to the motorized over-snow vehicle use suitability maps, figures B-11 and B-12.

Crane Mountain (GA-SV-MA7-Crane)

This area is located approximately 5 miles south and east of the town of Bigfork. Mountain biking is a popular summer use of the area. In addition, there are approximately 43 miles of motorized over-snow vehicle trails, which are also available for Nordic skiing and snowshoeing.

The recreation opportunity spectrum setting for the summer season is roaded natural, and it is semiprimitive motorized for the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well-maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. Winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6b. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-SV-MA7-Crane-DC)

- 01 A system of trails provides mountain biking opportunities in the Crane Mountain area close to local communities.
- 02 The Crane Mountain groomed motorized over-snow vehicle trail system provides for motorized winter recreation opportunities close to local communities.

Objective (GA-SV-MA7-Crane-OBJ)

- 01 Construct a designated mountain bike trail system in the Crane Mountain area.

Krause Basin (GA-SV-MA7-Krause)

This area is located in the Krause Creek area in the foothills of the Swan Mountains close to the communities of Kalispell and Bigfork, Montana, about 20 miles drive east of Kalispell. This area provides nonmotorized and motorized opportunities. Nonmotorized opportunities include hiking, biking, and

horseback riding. An interpretive nature trail that goes through a cedar/hemlock old forest stand is within this area. In July and August, the area provides about 13 miles of wheeled motorized trail opportunities that connect to the Alpine #7 motorized trail system along the Swan Divide. During the winter months, the area is suitable for motorized over-snow vehicle use.

The recreation opportunity spectrum setting for the summer season is roaded natural, and it is semiprimitive motorized for the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

This focused recreation area reflects natural conditions with some development in the form of trailhead, trail markers and trail signing. Management focus will be on frequent site visits by forest employees, obliterating user-created trails and focusing use on designated trails through use of trailhead signage, and additional facilities (such as a toilet), if needed to protect resources. Vegetation management activities occur to achieve desired conditions within this management area 7 area, with the expected intensity of vegetation management the same as management area 6b. Refer to management area 6b for vegetation management direction.

Desired conditions (GA-SV-MA7-Krause-DC)

- 01** Existing trails provide summer (July and August) wheeled motorized trail experience on designated and signed routes. This area provides for motorized winter recreation opportunities close to local communities.
- 02** Nonmotorized (hiking, mountain biking, and equestrian) trail opportunities are provided.
- 03** The old forest conditions of the cedar/hemlock stand containing the interpretive nature trail are preserved and continue to provide the opportunity to educate the public about this forest type.

Holland Lake Campground (GA-SV-MA7-Holland Lake)

This area encircles Holland Lake in the south end of the Swan Valley. It includes the Holland Lake developed campground and day-use areas, and the Owl Creek Packer Camp. Camping, boating, swimming, horseback riding, fishing, and hiking are popular uses of this area. An interpretive nature trail is located near the campground. This area also encompasses the popular Holland Falls National Recreation Trail, a 1.6-mile trail that follows the lake shoreline to the base of Holland Falls at the head of the lake. The Holland Lake area is also a popular access point to the trail system in the Bob Marshall Wilderness Complex.

The recreation opportunity spectrum setting for the summer season is roaded natural, and it is semiprimitive motorized for the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling opportunities. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

Desired conditions (GA-SV-MA7-Holland Lake-DC)

- 01** Holland Lake Campground and associated recreational facilities provide quality visitor experiences in a natural setting. Facilities are maintained to a standard that protects Forest resources and are updated as needed to accommodate current and anticipated recreational use.

Swan Lake Campground and Day-Use Area (GA-SV-MA7-Swan Lake)

This campground and day-use area is located about 14 miles south of Bigfork, Montana, at the southern end of Swan Lake, near the village of Swan Lake, Montana. The majority of the shoreline of Swan Lake is privately owned; this area provides public access to the 3,300-acre lake. Boating, swimming, camping, fishing, and hiking are popular activities.

Desired conditions (GA-SV-MA7-Swan Lake-DC)

- 01** Swan Lake Campground and day-use area provides a high-quality water-based visitor experience. Facilities are maintained to a standard that protects Forest resources and are updated as needed to accommodate current and anticipated recreational use.

Camp Misery trailhead (GA-SV-MA7-Camp Misery)

This management area 7 area encompasses the Camp Misery trailhead, which is a very popular access point to the Jewel Basin Hiking Area. The Jewel Basin hiking area is an approximately 15,300-acre area maintained exclusively for hiking and camping, characterized by high alpine meadows, lakes, and forests. The Camp Misery trailhead is in close proximity to Kalispell, Montana, and is readily accessible by car.

The recreation opportunity spectrum setting for the summer season is roaded natural, and it is semiprimitive motorized for the winter season. Roaded natural provides a natural-appearing landscape that supports higher concentrations of use, user comfort, and social interactions with a well-defined road system. Facilities are well maintained to protect Forest resources and are updated as needed to accommodate current and anticipated recreational use. The winter semiprimitive motorized setting provides opportunities for exploration and challenge in backcountry skiing and snowmobiling. Routes are typically ungroomed but are often signed and marked, with additional areas for traveling cross-country.

Desired conditions (GA-SV-MA7-Camp Misery-DC)

- 01** The Camp Misery trailhead provides quality visitor experiences and facilities in a natural setting. Facilities are maintained to a standard that protects Forest resources and are updated as needed to accommodate current and anticipated recreational use.

Chapter 5. Monitoring Program

Introduction

Monitoring provides feedback for the Forest's 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 whether 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 CFR § 219.12 and in the directives at 1909.12 chapter 30.

The 2012 planning rule states that a plan monitoring program must contain one or more monitoring questions and associated indicators addressing each of the following:

1. The status of select **watershed conditions**.
2. The status of select **ecological conditions**, including **key characteristics** of terrestrial and aquatic ecosystems.
3. The status of **focal species** to assess the **ecological conditions** required under § 219.9.
4. The status of a select set of the **ecological conditions** required under § 219.9 to contribute to the recovery of **federally listed threatened and endangered species**, conserve proposed and **candidate species**, and maintain a viable population of each **species of conservation concern**.
5. The status of **visitor use, visitor satisfaction, and progress towards meeting recreation objectives**.
6. Measurable changes in the plan area related to **climate change** and other **stressors** that may be affecting the plan area.
7. Progress towards **meeting the desired conditions and objectives** in the plan, including providing **multiple-use opportunities**.
8. The effects of each management system to determine that they do not substantially and permanently **impair the productivity of the land**.

Additionally, monitoring may be conducted for other purposes, such as to

- comply with USFWS biological opinion terms and conditions or court orders;
- track social, cultural, and economic indicators;
- discern the magnitude of departures from desired conditions and the reasons for the departures, if applicable;
- reduce uncertainty or verify assumptions;
- assess whether there are changes in drivers or stressors that are affecting sustainability; and
- respond to key public issues.

The plan monitoring program addresses the most critical components related to informed management of the Forest's resources within the financial and technical capability of the agency. Every monitoring

question links to one or more desired conditions, objectives, standards, or guidelines. However, not every plan component has a corresponding monitoring question.

This monitoring program is not intended to depict all monitoring, inventorying, and data-gathering activities undertaken on the Forest, nor is it intended to limit monitoring to just the questions and indicators listed in Table 49 through table 68. Consideration and coordination with broader-scale monitoring strategies adopted by the regional forester, multi-party monitoring collaboration, and cooperation with State and private forestry as well as research and development, as required by § 219.12(a), 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.

The monitoring program sets out the plan monitoring questions, plan components, and associated indicators. The monitoring program will be guided by a monitoring guide that will provide more detailed information on the monitoring questions, indicators, frequency and reliability, data sources and storage, and cost. For example, the Forest anticipates that Forest Inventory and Analysis data will be used to monitor vegetation conditions and that data will be updated about every 10 years. However, data sources and frequency of updates may change, so the specifics will be included in a monitoring guide. It is important to note that not all monitoring questions are expected to be evaluated biennially.

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.

An interdisciplinary team will develop a biennial monitoring evaluation report that summarizes the results of completed monitoring, including the evaluation of the collected data and relevant information from broader-scale or other monitoring efforts. The report will also include recommendations for the responsible official as to whether a change to forest plan management activities, the monitoring program, or a new assessment may be warranted based on the assessed information. The monitoring evaluation report is used to inform adaptive management of the plan area and will be made available to the public (26 CFR § 219.12(d)(2)).

Some types of monitoring indicators require longer time frames for thorough evaluation of results, but a biennial review of the certain information that has been collected ensures timely evaluation to inform planning. The biennial monitoring evaluation does not need to evaluate all questions or indicators on a biennial basis but must focus on new data and results that provide new information regarding management effectiveness, progress towards meeting desired conditions or objectives, changing conditions, or validation (or invalidation) of assumptions.

Table 49 through table 68 are organized to display the monitoring question(s), the indicator(s) for answering the monitoring question(s), and the plan components associated with them. Monitoring questions are used to evaluate whether management is maintaining or moving towards or away from desired conditions. Indicators are the specific resource measures used in answering the monitoring

questions. In general, the forest plan components listed are the primary direction being addressed by the monitoring question.

Adaptive management

The revised plan follows adaptive management principles outlined in the planning rule directives (Forest Service Handbook 1909.12, zero code 06.1 and 06.2). Assumptions and uncertainty are characterized throughout the plan and the plan's environmental impact statement. For example, the Forest modeled acres burned by wildfire over the last 1,000 years and interpreted results to assess the natural range of variability for the Forest's ecosystems. Actual acres burned by wildfire in the last 100 years were graphed to help validate assumptions, modeled acres that may be burned by wildfire in the future based upon projections of downscaled climate models, and disclosed the uncertainty of the models. The environmental impact statement used this information to inform the establishment of desired conditions and to assess effects of alternatives on ecological sustainability, considering likely future environments. Once the plan is implemented, monitoring item MON-TE&V-02 would be used to assess wildfire acres by burn severity class and monitoring item MON-T&E-LYNX-01 would be used to relate this information to the percentage of lynx habitat burned by wildfire in each lynx analysis unit. This monitoring information would be shared internally and with the public through the monitoring report so that the Forest can adapt its strategies and adjust decisions based upon what has been learned.

Items included in this monitoring plan also use data collection protocols for terrestrial and aquatic ecosystems at appropriate temporal and spatial scales. For example, monitoring item MON-TE&V-01 would be used to assess the change in key ecosystem characteristics of forest and non-forest vegetation at the scale of the potential vegetation type as well as forestwide. Using adaptive management principals, recently remeasured Forest Inventory and Analysis data informed the development of management direction in the revised plan and will assist the Forest in determining if adjustments to management direction are needed in the future. For example, Forest Inventory and Analysis data was used to assess the trend in the amount of old-growth forest by determining the amount burned by wildfire since the last Forest Inventory and Analysis measurements were completed. In light of this monitoring information, the revised plan has added plan components that place more emphasis on management for key ecosystem characteristics of old-growth forest, such as live trees and snags in the 20-inch-d.b.h. class. Monitoring item MON-WL-10 would be used to assess the status of habitat for wildlife species associated with snags and live trees in the 20-inch-or-greater d.b.h. class. Monitoring item MON-WL-15 would be used to assess the status of the breeding season bird community on the Forest using Integrated Monitoring in Bird Conservation Regions data and reports on species associated with those characteristics.

Past monitoring has helped to inform development of plan components and will help make the plan adaptive in the future. For example, birds, including neo-tropical migratory birds, have been extensively monitored on the Forest. The Forest participates in the Region 1 Landbird Monitoring Program that includes (1) standard point-count surveys; (2) monitoring of avian productivity and survivorship (MAPS); and (3) single species habitat use and distribution surveys. In addition to point count surveys, the Avian Science Center at the University of Montana conducted habitat and distribution surveys for individual bird species on the Forest from 1994 to 2004, including flammulated owls, goshawks, and black-backed woodpeckers. The USDA Forest Service Northern Region Songbird Monitoring Program³³ has provided

³³ R. L. Hutto & J. S. Young, J. S. (1999), *Habitat relationships of landbirds in the Northern Region*, USDA Forest Service (Ogden, UT: USDA Forest Service, Rocky Mountain Research Station), retrieved from <https://www.treesearch.fs.fed.us/pubs/37402>, https://www.fs.fed.us/rm/pubs/rmrs_gtr032.pdf, planning record exhibit # 00582.

data on occupancy, habitat relationships, and effects from past management activities for breeding birds in western Montana.

For aquatic ecosystems, monitoring item MON-WTR-01 would be used to assess water quality and riparian and aquatic habitats. Pacific Fish Strategy/Inland Native Fish Strategy biological opinion monitoring data was used to develop plan components and will be used in the future to test assumptions and assess the trend in key ecosystem characteristics of aquatic ecosystems. For example, metrics such as percent fines, residual pool depth, percent pools, and median substrate size will be collected, along with native fish population monitoring using bull trout redd counts, electrofishing, and genetic status monitoring (in cooperation with MFWP). This information will enable the Forest to adapt its management strategies and adjust decisions in the future, as needed, based upon what has been learned.

Monitoring scale and responsibility

Monitoring occurs at the scale of the Forest, the Northern Region, and even larger areas. Monitoring may be the responsibility of the Forest Service or another agency or may involve multiple agencies and organizations. For example, key ecosystem characteristics related to a changing climate may be monitored at very large scales. One key ecosystem characteristic associated with high elevations is “persistent spring snow,” which is useful in monitoring habitat for species such as the wolverine. Persistent spring snow maps and data layers were produced by researchers at the scale of the broad range of the wolverine. These maps and data layers are updated by researchers, not by the individual national forests, and changes are made only if and when researchers update the existing data. Similarly, a research effort would be required for monitoring of deep, fluffy snow in critical habitat for Canada lynx, or for a retrospective study of the density of snowshoe hares and habitat use by lynx in response to various past vegetation management practices.

Similarly, the presence and distribution of threatened or endangered species, species of conservation concern (see glossary), and species that are of interest to the public for hunting, trapping, fishing or observing, may be assessed as part of a research effort or monitored across large scales in cooperation with others (e.g., IND-WLD-28, 45, 69-72, and 75 in table 53). The Montana Natural Heritage Program, MFWP, USFWS, the tribes, universities, research stations, nongovernmental organizations, and Federal agencies other than the Forest Service are all instrumental in monitoring species across multiple land management jurisdictions (e.g., Integrated Bird Monitoring in Bird Conservation Regions).

Monitoring related to the grizzly bear occurs at the large scale of the NCDE and is the responsibility of multiple agencies. For example, the USFWS and MFWP are responsible for monitoring grizzly bear-human conflicts, grizzly bear-livestock conflicts, and grizzly bear mortality. As directed by the draft NCDE Grizzly Bear Conservation Strategy,³⁴ monitoring results are to be reported to the NCDE coordinating committee. The coordinating committee is not a decisionmaking body, although it may provide recommendations to member agencies from time to time. Additionally, the coordinating committee does not supersede the authority of the management agencies beyond the specific actions agreed to by the signatories to the Grizzly Bear Conservation Strategy.

³⁴ USFWS (2013), *Draft Northern Continental Divide Ecosystem grizzly bear conservation strategy*, U.S. Fish and Wildlife Service, retrieved from <http://www.fws.gov/mountain-prairie/species/mammals/grizzly/continentalindex.html>, http://www.fws.gov/mountain-prairie/species/mammals/grizzly/NCDE_Draft_CS_Apr2013_Final_Version_corrected_headers.pdf.

As detailed in the monitoring sections of the draft Grizzly Bear Conservation Strategy, the following monitoring information will be compiled by the USFS to support the habitat-related tasks of the NCDE monitoring team:

- Coordinate updates and maintenance of the motorized access, developed sites, and livestock allotments databases.
- Document and report any changes in motorized access route density, levels of secure core habitat, developed sites and their capacity, livestock allotments, and permitted sheep numbers biennially, according to the monitoring schedules described in chapter 3 of the draft Grizzly Bear Conservation Strategy.
- Ensure that cooperators have the tools and training to evaluate motorized access route density and secure core habitat for projects.
- Evaluate the need to update or change the methods used to evaluate habitat parameters and make recommendations to the NCDE coordinating committee on such changes, as necessary.
- Set and maintain standards, definitions, values, formats, and processes for collecting and updating habitat data and assessment models consistently across jurisdictions.

In order to accomplish this, a coordinated approach to the funding, use, and intensive maintenance of GIS databases is required. The Grizzly Bear Conservation Strategy monitoring team will include biologists and GIS specialists from the signatory agencies (including the USFS) and the tribes.

Because the draft Grizzly Bear Conservation Strategy describes the need for monitoring to adequately assess habitat conditions, for adherence to the habitat standards, and to report on the habitat monitoring items identified in the draft Grizzly Bear Conservation Strategy, some of the monitoring items listed in the table below are part of the Northern Region's broad-scale monitoring strategy, but these will also be evaluated at the Forest scale. The grizzly bear monitoring questions with an "NCDE" prefix, as identified in the tables, will apply to the NCDE national forests (Flathead, Helena-Lewis and Clark, Kootenai, and Lolo). The other monitoring items listed in this chapter are intended to be used for forest plan monitoring at smaller scales but may also be compiled at a regional scale.

Monitoring of ecosystem characteristics may also be applied at the mid-scale or project level. For example, spatial mapping of forest size classes or canopy cover classes may be done using the Northern Region's existing vegetation classification system (Region 1 VMap) or other vegetation databases to assess habitat conditions and their distribution for projects. Species-specific habitat models may also be used at the project scale to assess potential effects of forest plan implementation. For example, project-level monitoring can be used to assess the availability of multistoried hare habitat within a lynx analysis unit or to assess spatial distribution of old-growth forest patch size and connectivity within a subwatershed.

Physical and Biological Elements

The plan monitoring program contains monitoring questions and indicators addressing the physical and biological elements of the ecosystem, including questions and indicators associated with vegetation, soils, fish, water, and wildlife (shown in table 49 through table 57).

Aquatic ecosystems

Table 49. Plan monitoring questions and indicators for aquatic ecosystems

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-WTR-01: What are the changed conditions of instream physical habitat parameters in managed vs. unmanaged sites?	FW-DC-WTR-04	IND-WTR- 01. PIBO monitoring: positive trend in PIBO metrics such as bank angle, wood frequency, percent fines, residual pool depth, percent pools, and median substrate size (D50) 02. Results of McNeil core samples of percent fines
MON-WTR-02: To what extent are forest management activities moving towards habitat objectives for native fish?	FW-OBJ-CWN-01 FW-OBJ-WTR-01 through 04 FW-DC-CWN-01	IND-WTR- 03. Number of fish passage barriers removed or created 04. Miles of roads decommissioned within the riparian management zone 05. Number of culverts removed or upgraded 06. Number of activities with stream miles of habitat improvements
MON-WTR-03: What vegetation treatment activities have occurred in the riparian management zone?	FW-STD-RMZ-05, 06 FW-DC-RMZ-01, 03, 04, 05 FW-RMZ-OBJ-01 FW-GDL-CWN-01	IND-WTR- 07. Treatment type and acres within riparian management zones 08. Number of entries and road crossing inside riparian management zones
MON-WTR-04: What is the condition of water quality in waterbodies?	FW-DC-WTR-06	IND-WTR- 09. Number of waterbodies listed on the Montana Department of Environmental Quality integrated report (305b/303d)
MON-WTR-05: What is the status of native fish populations?	FW-DC-CNW-01	IND-WTR- 10. Number of redds (bull trout) 11. Fish density—number/100 square meters 12. Degree of spread of hybridization (MFWP data, redd counts)
MON-WTR-06: Do management activities contribute nutrients to Flathead Lake?	FW-DC-WTR-17	IND-WTR- 13. Amount of phosphorus, nitrites, and nitrates that originate from NFS lands.
MON-WTR-07: What is the status of streambanks within grazing allotments?	FW-GDL-05	IND-WTR- 14. Percent streambank alteration 15. Percent stubble height

Terrestrial ecosystems and vegetation and focal species

Table 50. Plan monitoring questions and indicators for terrestrial ecosystems and vegetation and focal species

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-TE&V-01: What is the change in key ecosystem characteristics for forest and non-forest vegetation?	FW-DC-TE&V-03 FW-DC-TE&V-07, 08, 10 through 15	IND-TE&V- Proportion (percentage of total acres) forestwide and/or by PVT for each of these indicators: 01. Dominance type (i.e., cover type)—forestwide 02. Species presence—forestwide and by PVT 03. Forest size class—forestwide and by PVT 04. Tree canopy cover—forestwide and by PVT 05. Old-growth forest—proportion of area forestwide and by potential vegetation type. 06. Very large tree presence—proportion of area forestwide and by potential vegetation type 07. Very large tree density, trees per acre. All species combined as well as for these species groups: cedar, Douglas-fir, larch, ponderosa pine, western white pine, cottonwood 08. Snag density: Snags per acre ≥ 10 inches d.b.h.; ≥ 15 inches d.b.h.; ≥ 20 inches d.b.h., forestwide and by PVT
MON-TE&V-02: What is the change in amount and severity of wildfire and the status of fire regimes?	FW-DC-TE&V-03, 25 FW-DC-FIRE-04	IND-TE&V- 09. Forestwide acres burned by wildfire by severity class (low, medium, high) and acres not burned
MON-TE&V-03: What is the change in insect hazard and root disease severity?	FW-DC-TE&V-03 and 20	IND-TE&V- 10. Acres or percent of Douglas-fir beetle hazard, mountain pine beetle hazard, western spruce budworm hazard, and root disease severity
MON-TE&V-04: How many acres of vegetation treatments are occurring that contribute to maintaining or moving towards achieving desired conditions in the plan?	FW-OBJ-TE&V-01, 02, 03, 04	IND-TE&V- 11. Acres treated by vegetation management actions (e.g. harvest, prescribed fire, precommercial thinning, tree/shrub planting, fuel treatments, control of invasive plants) 12. Acres treated by vegetation management that specifically address the Northern Region indicators associated with restoration and resilience of forests
MON-TE&V-05: To what extent have management actions maintained required levels of snags or snag replacement trees within harvest units?	FW-STD-TE&V-03 GA-STD-HH, SF, SV, NF-01 GA-STD-MF, SM-02	IND-TE&V- 13. Snag and snag replacement tree densities retained within a sample of timber harvest areas

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-TE&V Focal-01: What is the change in ecological conditions within the warm-moist and cool-moist PVTs, as indicated by conditions suitable for western white pine?	FW-DC-TE&V-04, 07	IND-TE&V Focal- 01. Proportion (percentage of total acres) forestwide and by the warm-moist and cool-moist PVTs for western white pine species presence 02. Proportion (percentage of total acres) forestwide of forest size classes in the areas where western white pine is present
MON-TE&V Focal-02: What management actions are contributing to the restoration of western white pine?	FW-OBJ-TE&V-02	IND-TE&V Focal- 03. Acres treated for the purpose of sustaining or restoring western white pine 04. Survival of planted western white pine seedlings

Plant species at risk

Table 51. Plan monitoring questions and indicators for plant species at risk (threatened, endangered, proposed, and candidate plant species and species of conservation concern)

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-PLANT-01: What is the status of water howellia in areas where disturbances (natural or human-caused) have occurred?	FW-DC-PLANT-01	IND-PLANT- 01. Presence/absence of water howellia in habitat that has been disturbed
MON-PLANT-02: How are ecological conditions in the cold PVT affecting whitebark pine populations and habitats?	FW-DC-PLANT-03	IND-PLANT- 02. Proportion (percentage of total acres) forestwide and by cold PVT for whitebark pine dominance type (i.e., cover type) 03. Proportion (percentage of total acres) forestwide, and by cold PVT for whitebark pine species presence 04. Proportion (percentage of total acres) forestwide of forest size classes in the areas where whitebark pine is present.
MON-PLANT-03: What management actions are contributing to the restoration of whitebark pine?	FW-OBJ-PLANT-01	IND-PLANT- 05. Acres treated for the purpose of sustaining or restoring whitebark pine. 06. Survival of planted whitebark pine seedlings
MON-PLANT DIV-01: What is the status of the known occurrences of plant species of conservation concern?	FW-DC-PLANT DIV-01	IND-PLANT DIV- 01. Occurrences of plant species of conservation concern and associated habitats that are being monitored

Non-native invasive species

Table 52. Plan monitoring questions and indicators for non-native invasive species

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-NNIP-01: What is the status of plant communities at highest risk of negative impacts to their system functions from established or new invaders?	FW-DC-NNIP-01, 02, 04	IND-NNIP-01: Percent of invasive plant species cover within identified high-risk/high-priority areas. These would include such areas as forests of the warm-dry PVT, dry grassland plant communities, wilderness trailheads, and management area 3b (special areas)
MON-NNIP-02: What management actions are contributing to coordination and cooperation with adjacent landowners and partners in managing non-native invasive weeds?	FW-DC-P&C-16	IND-NNIP-02: Number and type of weed management actions conducted involving coordination and cooperation with partners and adjacent landowners

Wildlife

Note that Northern Rockies Lynx Management Direction plan components can be found in appendix A, along with monitoring items required for this lynx direction. Monitoring items required in the biological opinion for the revised forest plan (USFWS 2017³⁵) are also included in this monitoring plan. If a monitoring item applies to the NCDE, the alphanumeric identifier references NCDE.

Table 53. Plan monitoring questions and indicators for grizzly bear

Monitoring Question	Plan Component(s)	Indicator(s)
MON-NCDE-01: Within the NCDE primary conservation area, what is the level of secure core, open motorized route density (> 1 square mile) and total motorized route density (> 2 square miles) within each bear management subunit during the non-denning season?	FW-STD-IFS-02	IND-NCDE- For each grizzly bear subunit in the PCA: 01. Open motorized route density percentage 02. Total motorized route density percentage 03. Secure core percentage
MON-NCDE-02: a) Within the NCDE PCA, what is the number and overnight capacity of developed recreation sites designed and managed for overnight use on NFS lands within each bear management unit, and how does this compare to the baseline? b) Within the NCDE primary conservation area, what is the status of administrative sites, day-use developed recreation sites, and trailheads in each bear management unit?	FW-STD-REC-01 FW-GDL-REC-01	IND-NCDE- 04. Number of developed recreation sites (NCDE definition) managed for overnight use in each grizzly bear management unit. 05. Capacity of sites managed for overnight developed recreation use in each grizzly bear management unit. 06. If increases in number or capacity occur, measures used to reduce the risk of grizzly-bear human conflicts. 07. Number of new administrative sites, day-use developed recreation sites or trailheads (NCDE definition) in each grizzly bear management unit.

³⁵ USFWS (2017). Biological opinion for the revised forest plan—Flathead National Forest. Helena, MT: U.S. Fish & Wildlife Service, Ecological Services, pp. IV-93-94. Retrieved from www.fs.usda.gov/goto/flathead/fpr.

Monitoring Question	Plan Component(s)	Indicator(s)
MON-NCDE-03: Within the NCDE primary conservation area, is there a change in the number of allotments? Have conflicts occurred between grizzly bears and livestock on NFS lands?	FW-STD-GR-05	IND-NCDE- 08. Number of livestock allotments in the PCA (by livestock type). 09. Permitted animal unit months for sheep allotments. 10. Number of grizzly bear-livestock conflicts on NFS lands by grizzly bear management zone (e.g., PCA, DCA) and livestock type.
MON-NCDE-04: If new leasable and locatable mineral activities occur in the PCA, do the record of decision and permit/plan of operation include a monitoring plan for changes in habitat and/or measures to avoid, minimize, or mitigate environmental impacts to grizzly bears or their habitat?	FW-STD-E&M-01, 03 through 06	IND-NCDE- 11. Number of permits authorized in the PCA and mitigation measures included in the permit/plan of operations where it is determined there is potential for adverse effects to the grizzly bear population or its habitat resulting from leasable or locatable mineral activities.
MON-NCDE-05: Within the NCDE primary conservation area, what is the status of grizzly bear subunits that have temporary increases in motorized access due to projects (see glossary)?	FW-STD-IFS-03	IND-NCDE- 12. Percent change in the 10-year running average of open motorized route density, total motorized route density, and secure core for each subunit that has had temporary increases in projects (see appendix C for examples of methods).
MON-NCDE-06: Within the NCDE primary conservation area, are projects (see glossary) completed within the five-year time period specified by guideline FW-GDL-IFS-01?	FW-GDL-IFS-01	IND-NCDE- 13. For each grizzly bear subunit in the PCA with a project (see glossary): Number of years to complete a project (the definition of "project (in grizzly bear habitat in the NCDE)" in the glossary).
MON-NCDE-07: In the Salish DCA, what is the density of roads and motorized trails on NFS lands that are open to public use during the non-denning season? In zone 1 outside the Salish DCA, what is the density of roads on NFS lands that are open to public use during the non-denning season?	GA-SM-STD-01	IND-NCDE- 14. Density of roads and motorized trails on NFS lands in the DCA that are open to public motor vehicle use during the non-denning season. 15. Density of roads on NFS lands in zone 1 outside the DCA that are open to public motor vehicle use during the non-denning season.
MON-NCDE-08: What is the risk of human disturbance in areas modeled as grizzly bear denning habitat during the den emergence time period (see glossary)?	FW-STD-REC-05	IND-NCDE- 16. Percentage of modeled grizzly bear denning habitat where public motorized over-snow vehicle use is allowed during the den emergence time period (MFWP model for the NCDE or subsequent updates)

Table 54. Plan monitoring questions and indicators for Canada lynx

Monitoring Question	Plan Component(s)	Indicator(s)
MON- LYNX-01: How much of lynx critical habitat does not yet provide stand initiation snowshoe hare habitat (PCE1a) but is progressing towards providing PCE1a?	Critical Habitat, FW-DC-WL-05	IND-LYNX- 01. Percentage of lynx critical habitat on NFS lands in each lynx analysis unit that is not yet winter snowshoe hare habitat due to wildfire 02. Percentage of lynx critical habitat on NFS lands in each lynx analysis unit that is not yet winter snowshoe hare habitat due to vegetation management projects

Monitoring Question	Plan Component(s)	Indicator(s)
MON- LYNX-02: What is the percentage of lynx critical habitat that has vegetation treatments in stand initiation hare habitat (PCE1a)?	Critical Habitat, FW-DC-WL-05	IND-LYNX- 03. Number of acres of lynx critical habitat on NFS lands in each lynx analysis unit that were precommercially thinned using exceptions to VEGS5 04. Number of acres of lynx critical habitat on NFS lands in each lynx analysis unit that were precommercially thinned using wildland-urban interface exemptions to VEGS5
MON- LYNX-03: If modified precommercial thinning techniques are used in lynx critical habitat, do they increase snowshoe hare habitat (PCE1a) and/or its persistence?	Critical Habitat, FW-DC-WL-05	IND-LYNX- 05. Number of acres of lynx critical habitat that were treated with modified thinning techniques under VEG S5 exception #2 or #3 06. The percentage of dense horizontal cover developing over time in areas treated with modified thinning techniques compared to areas treated with conventional thinning techniques.
MON- LYNX-04: What is the percentage of lynx critical habitat that has vegetation treatments in multistoried hare habitat (PCE1a)?	Critical Habitat, FW-DC-WL-05	IND-LYNX- 07. Number of acres of multistory hare habitat in lynx critical habitat on NFS lands in each lynx analysis unit that were treated using exceptions to VEGS6 08. Number of acres of multistory hare habitat in lynx critical habitat on NFS lands in each lynx analysis unit that were treated using wildland-urban interface exemptions to VEGS6
MON- LYNX-05: Are fuel treatment and vegetation management projects compliant with the Canada lynx vegetation standards in the Northern Rockies Lynx Management Direction?	Appendix A VEGS1, VEGS2, VEGS5, VEGS6	IND-LYNX- 09. Cumulative total acres of fuel treatment projects in lynx habitat conducted under exemptions to standards VEGS1, S2, S5, and S6 within the WUI (as defined by HFRA), by LAU and forestwide, since the end of 2017. 10. Number of projects/acres treated in lynx habitat conducted under exemptions to standards VEGS1, S2, S5, and S6 that result in more than three adjacent lynx analysis units that do not meet the standard VEG S1 (more than 30 percent of a lynx analysis unit that is not yet snowshoe hare habitat.) 11. Number of projects/acres treated in lynx habitat that create stand initiation hare habitat (e.g., regeneration harvest) that occur in LAUs that exceed VEGS1 (have >30% of area currently in stand initiation stage that does not yet provide hare habitat). 12. Number of timber management projects conducted under exceptions to VEG S5 and VEGS6 that regenerate more than 15 percent of lynx habitat on Forest lands within a lynx analysis unit in a 10-year period. 13. Cumulative total acres of vegetation treatments conducted under exceptions to VEG S5 and VEGS6 since the end of 2017.

Table 55. Plan monitoring questions and indicators for other wildlife species

Monitoring Question	Plan Component(s)	Indicator(s)
MON-WL-01: What is the status of habitat conditions that support harlequin ducks during the nesting season?	FW-DC-WL DIV-01, FW-GDL-WL DIV-05	IND-WL- 01. Stream habitat data on known harlequin duck nesting stream reaches (see aquatics section) 02. Number of projects authorized within the riparian management zone along known harlequin duck nesting stream reaches 03. Number of project authorizations that include timing requirements for harlequin duck nesting 04. Number of nesting stream reaches surveyed, number of harlequin duck broods detected, and size of broods, in cooperation with other partners
MON-WL-02: What is the status of habitat conditions that support flammulated owls during the nesting season?	FW-DC-WL DIV-01	IND-WL- 05. Percentage of the warm-dry PVT with presence of live trees and dead trees greater than or equal to 15 inches d.b.h. (preferably ponderosa pine, if able to query) 06. Acres and percentage of the Forest that meets modeled habitat criteria for flammulated owl habitat (as classified in R1 Summary database, using FIA data). 07. Density (canopy cover) in the ponderosa pine dominance type forestwide 08. Number of acres of forest treated in the warm-dry and warm-moist PVT focused on promoting desired habitat conditions for flammulated owls
MON-WL-03: What is the status of habitat conditions that support fisher?	FW-DC-WL DIV-01	IND-WL- 09. Percentage of area in the warm-moist PVT where very large live trees and very large dead trees ($\geq 20"$ DBH) are present. 10. Acres and percent of area in the warm-moist PVT that meets modeled habitat criteria for fisher winter and summer habitat (as classified in the R1 Summary database, using FIA data).
MON-WL-04: What is the status of forest conditions that support wildlife habitat connectivity for fisher and other species?	FW-DC-TE&V-19, FW-DC-RMZ-06, FW-DC-WL DIV-01	IND-WL- 11. In the areas of the Forest where the warm-moist PVT is concentrated: landscape pattern of forests where tree size class is 5 inches or greater DBH (small, medium, large and very large forest size classes), and tree canopy cover is greater than 40%. 12. In riparian management zones: acres where tree size class is 5 inches or greater DBH (small, medium, large and very large forest size classes), and tree canopy cover is greater than 40%. 13. In riparian management zones: distribution of areas where tree size class is 5 inches or greater DBH and tree canopy cover is greater than 40% 14. In key connectivity areas identified for the geographic areas: mapped distribution of forest cover with an average tree d.b.h. of 5 inches or greater and canopy cover greater than 40%

Monitoring Question	Plan Component(s)	Indicator(s)
MON-WL-05: What is the status of habitat conditions that support Clark's nutcrackers during the nesting season?	FW-DC-WL DIV-01, FW-OBJ-PLANT-01	IND-WL- 15. Trees per acre of live whitebark pine greater than or equal to 10 inches d.b.h., in the Cold PVT 16. Basal area per acre of live whitebark pine greater than or equal to 10 inches d.b.h., in the Cold PVT 17. Acres of whitebark pine habitat (i.e., acres in the cold PVT) affected by recent wildfire 18. Acres of vegetation management treatments that contribute to restoration of whitebark pine
MON-WL-06: What is the status of habitat conditions that support Townsend's big-eared bats and other bat species?	FW-DC-WL DIV-01, FW-GDL-CAVES-03	IND-WL- 19. Number of caves or structures (e.g., old buildings) surveyed and number of detections of Townsend's big-eared bats or other bat species 20. Number of evaluations for closure or removal of structures used by bats and measures specified to mitigate or provide for bat use
MON-WL-07: What is the status of habitat conditions that support common loons on code A territorial nesting lakes?	FW-DC-WL DIV-01, FW-OBJ-WL DIV-01, FW-GDL-WL DIV-03	IND-WL- 21. Number of code A territorial nesting lakes surveyed for loon presence (Hammond 2009 or subsequent updates), ³⁶ in cooperation with other partners 22. Number of loon breeding pairs/chicks detected on code A territorial nesting lakes during July 23. Structures installed to support common loon nesting (if needed) 24. Number of projects authorized on NFS lands within 150 yards of active loon nesting sites and number that included activity timing
MON-WL-08: What is the status of habitat for wildlife species associated with hardwood tree habitats on NFS lands?	FW-DC-TE&V-09, FW-OBJ-TE&V-03	IND-WL- 25. Percentage of NFS lands with presence of hardwood tree species (birch, aspen, or cottonwood). 26. Number of acres with vegetation management treatments focused on promoting hardwood tree species (birch, aspen and/or cottonwood)
MON-WL-09: What is the status of habitat for wildlife species associated with grass/forb/shrub habitats on NFS lands?	FW-DC-TE&V-09, FW-OBJ-TE&V-04, FW-OBJ-NNIP-01	IND-WL- 27. Percentage of NFS lands in the grass/forb/shrub condition class 28. Number of acres treated to promote grass/forb/shrub habitats for wildlife 29. Number of key ungulate winter habitat acres treated to control non-native invasive plants

³⁶ C. A. M. Hammond, (2009), Conservation plan for the common loon in Montana (Kalispell, MT: Montana Department of Fish, Wildlife and Parks, Montana Common Loon Working Group), retrieved from <http://fwp.mt.gov/fishAndWildlife/management/commonLoon/>.

Monitoring Question	Plan Component(s)	Indicator(s)
MON-WL-10: What is the status of habitat for wildlife species associated with snags and potential live snag replacement trees in the 20-inch-or-greater d.b.h. class?	FW-DC-TE&V-15, 16	IND-WL- 30. Percentage of NFS lands with presence of snags greater than or equal to 20 inches d.b.h. in each PVT 31. Average number of snags per acre on NFS lands greater than or equal to 20 inches d.b.h. in each PVT 32. Average number of live trees per acre greater than or equal to 20 inches d.b.h. in each PVT
MON-WL-11: What is the status of habitat for wildlife species associated with snags and potential live snag replacement trees in the 10-inch or greater d.b.h. class?	FW-DC-TE&V-15	IND-WL- 33. Percentage of NFS lands with presence of snags greater than or equal to 10 inches d.b.h. in each PVT 34. Average number of snags per acre on NFS lands greater than or equal to 10 inches d.b.h. in each PVT 35. Average number of live trees per acre greater than or equal to 15 inches d.b.h. in each PVT
MON-WL-12: What is the status of habitat for wildlife species associated with downed woody material?	FW-DC-TE&V-17	IND-WL-36: Average tons per acre on NFS lands of coarse woody material greater than 3 inches d.b.h. in each PVT
MON-WL-13: What is the status of habitat for wildlife species associated with forests burned with moderate- to high-severity wildfire?	FW-DC-TE&V-25, FW-GDL-TIMB-01 through 03	IND-WL- 37. Forestwide acres burned by wildfire by severity class (low, medium, high) in previous decade 38. Percentage of acreage burned with moderate- to high-severity wildfire followed by salvage harvest in previous decade 39. For wildfires with salvage harvest, acres of unburned forest or forest burned with low-severity retained within fire perimeter 40. For wildfires with salvage harvest, size range of burned forest patches retained within burn perimeter 41. For wildfires with salvage harvest, number of trees per acre greater than 20 inch d.b.h. retained within salvage harvest units that were verified old-growth forest prior to the fire
MON-WL-14: What is the risk of human disturbance in areas modeled as wolverine maternal denning habitat during the time period of February 15 to May 15?	FW-GDL-REC-04, FW-GDL-WL-04	IND-WL- 42. Projects or activity authorizations in modeled maternal denning habitat and design features to reduce the risk of disturbance 43. Percentage of modeled maternal denning habitat where public motorized over-snow vehicle use is allowed (Modeling based upon Copeland and Yates ³⁷ or subsequent updates for the northern Rocky Mountains by the USFWS or USFS Rocky Mountain Research Station)

³⁷ J. P. Copeland & R. E. Yates (2006), *Wolverine population assessment in Glacier National Park*, Missoula, MT: USDA Forest Service, Rocky Mountain Research Station, planning record exhibit # 00355.

Monitoring Question	Plan Component(s)	Indicator(s)
MON-WL-15: What is the status of the breeding season bird community on the Forest (including neo-tropical migratory birds)?	FW-DC-WL DIV-01	IND-WL- 44. Bird species presence on the Forest based upon data collected for Integrated Monitoring in Bird Conservation Regions. 45. Bird species density on the Forest based upon data collected for Integrated Monitoring in Bird Conservation Regions. 46. Bird species for which there are statistically significant changes in Bird Conservation Region 10.
MON-WL-16: What is the status of the aquatic amphibian community on the Forest?	FW-DC-WL DIV-01 FW-DC-WTR-12	IND-WL- 47. Aquatic sites surveyed for amphibian presence, in cooperation with other partners. 48. Amphibian species detections; whether there is evidence of reproduction 49. Percentage of sites surveyed where aquatic invasive species (plants or animals) are detected
MON-WL-17: What is the status of forest mesocarnivores (e.g., lynx, wolverine, fisher) on the Forest?	FW-DC-WL DIV-01	IND-WL- 50. Grid cells surveyed and number of detections of each mesocarnivore species on the Forest, in cooperation with other partners

Soils and geology

Table 56. Plan monitoring questions and indicators for soils and geology

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-SOIL-01: To what extent are vegetation management activities not causing irreversible damage to soil conditions?	FW-DC-SOIL-01 FW-STD-SOIL-01	IND-SOIL-01. Number of harvest units surveyed and percent that meet the soil quality standard post-harvest
MON-SOIL-02: How many miles of temporary road are constructed and rehabilitated?	FW-DC-SOIL-01 FW-STD-SOIL-03	IND-SOIL- 02. Miles of temporary roads constructed 03. Miles of temporary roads rehabilitated

Fire and fuels management

Table 57. Plan monitoring questions and indicators for fire and fuels management

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-FIRE-01: What management actions are contributing towards reducing wildland fuels?	FW-OBJ-FIRE-01 FW-DC-FIRE-02	IND-FIRE- 01. Acres of fuel reduction treatments in and out of the wildland-urban interface 02. Acres of treatment effectiveness by treatment type.
MON-FIRE-02: To what extent is natural fire used to achieve desired ecological, social, or economic conditions?	FW-DC-FIRE-03	IND-FIRE- 03. Number and acres of natural fire ignitions managed for ecological, social, or economic reasons and the number of natural ignitions managed with the primary goal of suppression

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-FIRE-03: To what extent is prescribed fire used to achieve desired ecological, social, or economic conditions?	FW-DC-FIRE-03	04. Number and acres of prescribed fire ignitions managed for ecological, social, or economic reasons

Human Uses and Designations of the Forest

The plan monitoring program contains monitoring questions and indicators addressing human uses of the Forest associated with the transportation system, recreation, scenery, timber production, and other socioeconomic factors. Monitoring items associated with designated areas such as recommended wilderness and wild and scenic rivers are also identified. Monitoring questions and indicators are shown in Table 58 through Table 68.

Sustainable recreation

Table 58. Plan monitoring questions and indicators for sustainable recreation

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-REC-01: What is the status of visitor use? MON-REC-02: Are facilities maintained to users' satisfaction?	FW-DC-REC-13 FW-DC-REC-14, 15 FW-DC-REC-04	IND-REC- Using the National Visitor Use Monitoring data, show trends in 01. Visitation estimates 02. Visitor activities 03. Percent overall satisfaction
MON-REC-03: Are the recreation objectives in the plan being achieved??	FW-OBJ-REC 01, 03, 04 GA-NF-OBJ-02GA-SV-MA7-Crane-OBJ-01 GA-SM-OBJ-01 GA-SM-MA7-Blacktailski-OBJ-01 GA-SM-OBJ-02 through 04	IND-REC- 04. Number of dispersed recreation sites on the Forest that have been rehabilitated to correct erosion or sanitation issues 05. Number of campgrounds that have been improved 06. Number of recreation cabin rentals added to the national reservation system since the record of decision 07. Number of bicycle trails constructed in the Whitefish Range vicinity 08. Construction of a bicycle trail in the Crane Mountain area 09. Construction of a nonmotorized trail that connects NFS lands in the Blacktail vicinity to the Foy's to Blacktail Trails system 10. Construction and designation of motorized trail connectors that provide high-elevation loop opportunities 11. Construction of a nonmotorized trail that connects the Whitefish Trail (Whitefishlegacy.org) to NFS lands
MON-REC-04: Are current recreation settings and opportunities meeting or moving toward desired recreation settings and opportunities?	FW-DC-SREC-01 FW-DC-WREC-01 FW-DC-REC-03	IND-REC-12: Management actions or activities that move towards desired recreation opportunity spectrum class characteristics

Scenery

Table 59. Plan monitoring questions and indicators for scenery

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-SCN-01: Is the existing condition and trend of the scenic character meeting or moving toward desired conditions??	FW-DC-SCN-02 FW-GDL-SCN-03	IND-SCN-01: Management actions or activities that move towards the desired scenic integrity objectives

Infrastructure

Table 60. Plan monitoring questions and indicators for Infrastructure (roads and trails)

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-IFS-01: Are road closure devices effective at restricting public motorized use?	FW-DC-IFS-12	IND-IFS-01: Number and percentage of road closure devices checked and percentage determined to be effective at restricting public motorized use
MON-IFS-02: What is the status of the road system on the Forest?	FW-DC-IFS-06 FW-OBJ-IFS-01 through 03 FW-GDL-IFS-03	IND-IFS- 02. Miles of roads open year-long by operational maintenance level 03. Miles of roads open seasonally by operational maintenance level 04. Miles of roads maintained by operational maintenance level 05. Miles of roads decommissioned 06. Miles of roads put into intermittent storage 07. Miles of reconstruction or improvement projects 08. Number of culverts inspected, assessed, and/or cleaned
MON-IFS-03: What is the status of the trail system on the Forest?	FW-DC-IFS-07 through 09 FW-OBJ-IFS-04 through 06	IND-IFS- 09. Miles of motorized and nonmotorized summer trails 10. Miles of motorized and nonmotorized winter trails 11. Miles and percent of system trails meeting standards 12. Miles of system trails improved 13. Miles of trails maintained 14. Miles of new motorized trails constructed 15. Miles of new nonmotorized trails constructed 16. Miles of trails reported reconstructed

Wild and scenic rivers, designated and eligible

Table 61. Plan monitoring questions and indicators for designated wild and scenic rivers

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-MA2a-01: Are the statutory requirements (outstandingly remarkable values, water quality, and free-flowing conditions) of the three forks of the Flathead Wild and Scenic River being protected?	MA2a-DC-01, 02, 06	IND-MA2a-01. Number, kind, extent, and evaluated outcomes of identified management activities that occur within designated wild and scenic river corridors

Table 62. Plan monitoring questions and indicators for eligible wild and scenic rivers

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-MA2b-01: Are the outstandingly remarkable values for which the river was deemed eligible and the free-flowing conditions protected?	MA2b-DC-01, 02	IND-MA2b-01. Number, kind, extent, and evaluated outcomes of identified management activities that occur within eligible wild and scenic river corridors

Wilderness, designated and recommended

Table 63. Plan monitoring questions and indicators for designated wilderness areas

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-WILD-01: Do management activities in designated wilderness areas preserve and protect wilderness character?	FW-MA1a-DC-01, 02 MA1a-GDL-03	IND-WILD- 01. Score on National Wilderness Stewardship Performance elements 02. Limits of acceptable change monitoring measures for the Bob Marshall Wilderness Complex and Mission Mountains Wilderness 03. The number and type of authorized motorized use and mechanized transport entry as reported through the USFS INFRA database 04. The number and type of unauthorized motorized use and mechanized transport 05. Number, kind, and extent of identified actions (e.g., natural and human-caused fire) that have occurred in designated wilderness areas on the Forest

Table 64. Plan monitoring questions and indicators for recommended wilderness areas

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-RWILD-01: Do outcomes from management activities protect the wilderness characteristics of the recommended wilderness area?	MA1b-DC-01, 02 MA1b-SUIT-06	IND-RWILD- 01. Number, kind, extent, and evaluated outcomes of identified management activities (including prescribed fire) that have occurred in recommended wilderness areas 02. Number and type of unauthorized motorized travel, uses, and mechanized transport

Inventoried roadless areas

Table 65. Plan monitoring questions and indicators for inventoried roadless areas

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-IRAs-01: Do outcomes from management actions maintain roadless area characteristics within inventoried roadless areas?	Roadless Area Conservation Rule ³⁸	IND-IRA-01. Number, kind, and extent of identified actions that have occurred in inventoried roadless areas on the Forest

Production of Natural Resources

Timber products

Table 66. Plan monitoring questions and indicators for timber products

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-TIMB-01: How are management actions contributing to a sustainable mix of forest products in response to market demands?	FW-DC-TIMB-02, FW-OBJ-01 and 02	IND-TIMB-01. Million board feet/million cubic feet offered and sold annually
MON-TIMB-02: How are management actions contributing to the recovery of economic value of dead or dying trees on suitable lands?	FW-DC-TIMB-02 and 05	IND-TIMB-02. Million board feet/million cubic feet offered and sold annually as salvage harvest

Economic and Social Environment

Table 67. Plan monitoring questions and indicators for the social and economic environment

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-S&E-01: To what extent is the Forest providing goods and services for local communities? MON-S&E-02: To what extent is the Forest contributing to desired conditions for a stable and functioning local economy?	FW-DC-S&E-02	IND-S&E- 01. Levels of production of multiple uses, including timber products, grazing, recreational visits, wilderness hunting and fishing opportunities, and downhill skiing (as measured through day visits, night visits, local and non-local visits, animal unit months, thousand cubic feet of harvest and sales) 02. Number of jobs and thousands of dollars in labor income resulting from Flathead National Forest management 03. Land payment revenues (e.g., Secure Rural Schools Act, payment in lieu of taxes, etc.) to state and counties from NFS lands

³⁸ USDA (2001), 36 CFR Part 294—Special areas, roadless area conservation rule (Washington, DC: USDA Forest Service), retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5050459.pdf.

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-S&E-03: To what extent do opportunities to connect people, including youth, with nature exist across the Forest?	FW-DC-S&E-03 FW-DC-R&E-01 through 04	IND-S&E- 04. Number and type of education and youth programs; National Visitor Use Monitoring report IND-REC-1 to 3; visitor center tracking 05. Number of youth participating in various Forest education and youth programs, including employment
MON-S&E-04: Is the cost of implementing the forest plan consistent with projections?	FW and GA objectives	IND-S&E-06. Forest annual budget, supplemented by partnerships and other outside funding.

Cultural resources

Table 68. Plan monitoring questions and indicators for cultural resources

Monitoring Question(s)	Plan Component(s)	Indicator(s)
MON-CR-01: To what extent are cultural resource objectives being met, and are they trending towards desired conditions to identify, evaluate, and nominate cultural resources for listing in the National Register of Historic Places?	FW-OBJ-CR-01 through 03	IND-CR- 01. Number of submitted cultural resource nominations to the State Historic Preservation Officer, and number of completed historic contexts, overviews, thematic studies, or cultural resources property preservation plans for significant cultural resources identified through inventory 02. Number of completed public outreaches or interpretive projects
MON-CR-02: To what extent are plan components ensuring treaty rights are preserved and trending towards desired conditions for consultation with each tribe?	FW-DC-CR-02 FW-OBJ-TRIB-01, 02	IND-CR- 03. Completion of a cooperatively established tribal consultation protocol 04. Number of completed consultations under the tribal consultation protocol

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Glossary

Note:

- Definitions specific to the Northern Rockies Lynx Management Direction are in appendix A of the forest plan.
- Terms and definitions applicable only within the delineated Northern Continental Divide Ecosystem grizzly bear management zones (see forest plan standard FW-STD-WL-01) are indicated by [NCDE] following the definition.

2012 planning rule Direction that sets forth process and content requirements to guide the development, amendment, and revision of land management plans to maintain and restore National Forest System land and water ecosystems while providing for ecosystem services and multiple uses, effective May 9, 2012 (36 CFR§ 219).

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 CFR § 219.5). This framework supports decisionmaking that meets management objectives while simultaneously employing a monitoring process that accrues information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decisionmaking in the face of uncertainty and changing conditions. It incorporates feedback from monitoring to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

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

administrative use A generic term for authorized agency activity. Specifically, in the portion of the Northern Continental Divide Ecosystem 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 non-denning season (see also **non-denning season**). [NCDE]

aerial retardant avoidance area A mapped avoidance area on National Forest System lands to protect resources. Avoidance areas include aquatic avoidance areas (minimum of a 300-foot buffer), terrestrial avoidance areas, and cultural resources, including historic properties, traditional cultural resources, and sacred sites. Refer to the Implementation Guide for Aerial Application of Fire Retardant (USDA, 2015) and avoidance area maps (USDA, 2016).

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

attractant A substance that attracts grizzly bears and other wildlife. This includes human food or drink (canned, solid, or liquid), livestock feed (except baled or cubed hay without additives), pet food, and garbage. [NCDE]

baseline The baseline for the Northern Continental Divide Ecosystem 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. [NCDE]

bear management subunit An area of a bear management unit, in the portion of the Northern Continental Divide Ecosystem 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)). [NCDE]

bear management unit An area about 400 square miles, in the portion of the Northern Continental Divide Ecosystem for grizzly bears mapped as the primary conservation area, that meets yearlong habitat needs of both male and female grizzly bears. [NCDE]

best management practice (BMP) 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 CFR § 219.19).

biodiversity The variety and abundance of plants, animals, and other living organisms as well as 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 such a way that provides for the genetic diversity to sustain a species over the long term.

biological evaluation A review of planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened, proposed, or sensitive species and documentation of the findings (Forest Service Manual 2672.4).

biological opinion A document stating the opinion of a federal agency, e.g. the U.S. Fish and Wildlife Service, on whether or not a Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

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

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

broad potential vegetation type A coarse grouping of habitat types based on broad climatic and site conditions such as temperature and moisture gradients. This is a grouping developed for the USDA Forest Service Northern Region that is applicable to broad-level analysis and monitoring (Milburn, Bollenbacher, Manning, & Bush, 2015). See also **potential vegetation type/potential vegetation group**.

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

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

candidate species (1) For a U.S. Fish and Wildlife Service candidate species, this is 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 a National Marine Fisheries Service candidate species, this is a species that is (a) 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 U.S.C. 1533(b)(3)(A)), or (b) 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 cover The proportion of ground covered by the vertical projection of the outermost perimeter of the natural spread of the tree crowns, usually expressed as a percentage.

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 fire, insects, and disease).

capacity (of developed recreation sites within the Northern Continental Divide Ecosystem 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). [NCDE]

carbon sequestration The direct removal of carbon dioxide from the atmosphere through biological processes such as forest growth.

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

cave Any naturally occurring void, cavity, recess, or system of interconnected passages that occurs beneath the surface of the Earth or within a cliff or ledge, whether or not the entrance is naturally formed or manmade. The term includes any natural pit, sinkhole, or other feature that is an extension of the entrance.

cave, significant See **significant cave**.

cave resource Any material or substance occurring in caves, including but not limited to biotic, cultural, mineralogic, paleontologic, geologic, and hydrologic resources.

clearcut harvest A tree-cutting method used to regenerate a stand that removes virtually all live trees to initiate a new seedling age class (a synonym is clearcutting). Regeneration may be natural or artificial (through planting). See also **even-aged regeneration harvest**.

clearcut with reserves The application of the clearcut harvest method but without removing all trees. Some trees are retained or reserved for an indefinite period (many decades or an entire rotation), to meet resource objectives, such as providing forest structure or future snag recruitment.

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 to 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, and facilitating ecological transitions in response to changing environmental conditions.

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

coarse filter A landscape-level concept and ecosystem approach to biodiversity management that focuses on the management of ecosystem processes and broad ranges of habitats. The 2012 planning rule states that plans are to be based on a complementary ecosystem and species-specific approach to provide for the diversity of plant and animal communities in the plan area and the long-term persistence of native species in the plan area. This approach is often referred to as the coarse-filter/fine-filter approach. See also **fine filter**.

coarse woody debris A piece or pieces of larger-sized dead woody material (e.g., dead boles, limbs, and large root masses) on the ground or in streams. Minimum size is generally 3 inches in diameter.

Code of Federal Regulations (CFR) An annual codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal government.

commercial activity See **commercial use or activity**.

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 trees and/or to reduce the fire hazard.

commercial use or activity A use or activity on National Forest System lands (a) for which an entry or participation fee is charged or (b) whose primary purpose is the sale of a good or service. In either case, whether the use or activity is intended to produce a profit is not a consideration (see 36 CFR § 251.51).

condition class Classification of the amount of departure from the natural (historical) fire regime based on key ecosystem components such as species composition, structural stage, stand age, and canopy closure.

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

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

conservation watershed network A collection of watersheds where management emphasizes habitat conservation and restoration to support native fish and other aquatic species. See also appendix E.

consultation See **interagency consultation**.

control With respect to invasive species, e.g., plant, pathogen, vertebrate, or invertebrate species, any activity or action taken to reduce the population, contain, limit the spread, or reduce the effects of an invasive species. Control activities are generally directed at established free-living infestations and may not necessarily be intended to eradicate the targeted infestation in all cases.

cover The elements of the environment used by an animal for hiding. Cover varies on a site-specific basis and depends on the species or the time of year. Cover may include topography as well as a variety of vegetation types (e.g., shrubs, dead trees, and live trees). The amount and quality of cover needed depends on the animal's size, mobility, and reluctance or willingness to venture into relatively open areas.

cover type The vegetation composition of an area, described by the plant species forming the majority of the total composition. See also **dominance type** and **forest type**.

critical habitat (for a threatened or endangered species) (1) The specific areas within the geographical area occupied by the species at the time it is listed, in accordance with the provisions of section 4 of the Endangered Species Act (16 U.S.C. 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 U.S.C. 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 U.S.C. 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 U.S.C. 1533 (a)(3) and (b)(2)).

cross-country skiing A form of skiing in which skiers rely on their own locomotion to move across snow-covered terrain rather than using ski lifts or other forms of assistance. Variants of cross-country skiing are adapted to a range of terrain that spans unimproved, sometimes mountainous terrain to groomed courses that are specifically designed for the sport. Note: Cross-country skiing is also referred to as Nordic skiing.

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

Crown of the Continent ecosystem A multi-jurisdiction, 28,000-square-mile area encompassing the northern Rocky Mountain region along the Continental Divide in Montana, Alberta, and British Columbia. For more information, see the assessment of the Flathead National Forest (USDA, 2014).

cubic foot A unit of measurement represented by a cube with sides one foot in length.

culmination of mean annual increment of growth See **mean annual increment of growth**.

cultural landscape A geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic value (Forest Service Manual 2364.41f).

cultural resource An object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties. Cultural resources include the entire spectrum of resources for which the Forest Service's heritage program is responsible, from artifacts to cultural landscapes, without regard to eligibility for listing in the National Register of Historic Places (Forest Service Manual 2360.5). Also known as heritage resource.

d.b.h. See **diameter at breast height**.

deferred trail maintenance The backlog of trails where planned maintenance is not performed on schedule.

demographic connectivity area An area intended to allow female grizzly bear occupancy and potential dispersal beyond the Northern Continental Divide Ecosystem to other recovery areas. [NCDE]

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 non-denning 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. [NCDE]

denning season The typical time period, within the Northern Continental Divide Ecosystem, during which most grizzly bears are hibernating in dens. There are no restrictions on motorized use related to grizzly bears during the denning season, which occurs

- west of the Continental Divide: from 1 December through 31 March.
- east of the Continental Divide: from 1 December through 15 April. [NCDE]

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 recreation 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.

detrimental soil disturbance Relates the intensity of soil disturbance to potential impairment of long term soil productivity. These disturbances includes the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter, and soil mass movement. (Forest Service Manual Supplement No. 2550-2014-1). See also **surface erosion**.

developed recreation site An area that has been improved or developed for recreation (36 CFR § 261.2). A recreation site on National Forest System lands that has a development scale of 3, 4, or 5:

- Development scale 3 (moderate site modification) is where facilities are about equal in terms of protection of the natural site and user comfort. The contemporary/rustic design of improvements is usually based on use of native materials. Inconspicuous vehicular traffic controls are usually provided. Roads may be hard surfaced and trails formalized, with the primary access over high-standard roads. Development density is about three family units per acre. Interpretive services are informal if offered but generally direct.
- Development scale 4 (heavy site modification) is where some facilities are designed strictly for comfort and the convenience of users and facility design may incorporate synthetic materials. There may be extensive use of artificial surfacing of roads and trails. Vehicular traffic control usually is obvious, with the primary access usually over paved roads. Development density is three to five family units per acre. Plant materials are usually native. Interpretive services, if offered, are often formal or structured.
- Development scale 5 (extensive site modification) is where facilities are mostly designed for the comfort and convenience of users and usually include flush toilets; may include showers, bathhouses, laundry facilities, and electrical hookups. Synthetic materials are commonly used. Walks may be formal and trails may be surfaced. Access is usually by high-speed highways. The development density is five or more family units per acre. Plant materials may be non-native. Formal interpretive services are usually available. Plant materials may be non-native, and mowed lawns and clipped shrubs are not unusual.

developed recreation site within the Northern Continental Divide Ecosystem primary conservation area For purposes of implementing standard FW-STD-REC-01, developed recreation sites on National Forest System 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). [NCDE]

diameter at 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 the diameter of a log measured 4.5 feet from the large end of the log.

dispersed recreation An area in a national forest or national grassland with limited or no amenities provided for recreational users (36 CFR § 261.2).

dispersed recreation site A recreation site on National Forest System lands that has a development scale of 0 to 2:

- Development scale 0 (no site modification) has no constructed features evident at the site.
- Development scale 1 (almost no site modification) has rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. The use of synthetic materials is excluded. The primary access is usually over primitive roads. The spacing is informal and is extended to minimize contacts between users.
- Development scale 2 (minimal site modification) has rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. The use of synthetic materials is avoided. The spacing is informal and is extended to minimize contacts between users. Primary access usually over primitive roads. Any interpretive services are informal, almost subliminal.

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

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

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

dominance type The category of terrestrial plant community representing the most common plant species (such as a tree species) or plant community type (such as grassland or shrubland) that occupies the site. The dominant species or plant community comprises at least 40 percent of the total species or community abundance, as measured by different methods depending on data source and plant community type (e.g., canopy cover, basal area, trees per acre). See also **cover type** and **forest type**.

driver (ecology) See **ecosystem driver**.

duff A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

dysgenic Biologically defective or deficient; exerting a detrimental effect on later generations through the inheritance of undesirable characteristics.

early-successional stage/seral 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 Flathead National Forest, this stage typically occurs in the period from 1 to 30 or 40 years after the disturbance and is dominated by grass, forbs, shrubs, and seedling/sapling-sized trees.

ecological and social characteristics Qualities of recommended wilderness areas that provide the basis for suitability for inclusion in the National Wilderness Preservation System; identified for each recommended wilderness area (see appendix 4). Often, the ecological characteristics are discussed in terms of *natural quality* and *undeveloped* and can be represented by landscapes where the evidence of human disturbance is not readily apparent or the intactness of an ecosystem. Social characteristics may be discussed in terms of *solitude* or *unconfined* or *primitive recreation* and are often represented by remote, quiet landscapes where recreation activities such as hiking, climbing, fishing, and hunting are predominant. Both ecological and social characteristics can have *other features of value*, such as a cave system (ecological) or cultural resources (social).

ecological condition Aspects of 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 whose dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and that can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence. Also refers to the quality of a natural unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species, and ecosystem diversity ensured for the future.

ecological sustainability See **sustainability**.

ecosystem A spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its

- **composition** The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.
- **structure** The organization and physical arrangement of biological elements such as snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.
- **function** Ecological processes that sustain composition and structure such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods. (36 CFR § 219.19)

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.

elk security habitat An area at least 0.5 mile from a route open to public motorized use during the elk hunting season that provides a mosaic of cover and forage. Elk security habitat is evaluated at a scale that is informed by interagency recommendations (if available) and is based on knowledge of the specific area and on the best available scientific information.

emergency situation A circumstance on National Forest System 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 National Forest System 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). [NCDE]

employment Labor input into a production process, measured in the number of person-years or jobs. A person-year is 2,000 working hours performed, for example, by one person working yearlong or by several persons working seasonally.

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

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

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

even-aged regeneration harvest A cutting method that removes most of the existing trees to create conditions suitable for initiation of a seedling age class. The seedlings may be established through natural or artificial (planting) means. The term even-aged regeneration harvest as used in this plan does not apply to the harvest of trees killed by a stand-replacing natural disturbance (e.g., high-severity fire, insect epidemic). See also **salvage harvest**.

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.

Federal Register (FR) The Federal Register is the official gazette of the United States government. It provides legal notice of administrative rules and notices and presidential documents in a comprehensive, uniform manner.

fine filter A component of the multi-level approach to biological conservation (i.e., coarse filter/fine filter), where the focus is on individual species (i.e., plant, animal) across a plan area. See also **coarse filter**.

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 regime The role of fire in ecosystems and its interactions with dominant vegetation. The periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, intensity (heat energy released), severity (ecological effect), seasonal timing, and aerial extent (Anderson, 1982). The five natural fire regimes on the Flathead National Forest are as follows:

- **I** 0 to 35 year frequency and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced);
- **II** 0 to 35 year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);
- **III** 35 to 100+ year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced);
- **IV** 35 to 100+ year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);
- **V** 200+ year frequency and high (stand replacement) severity.

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

fire severity The ecological effect of the fire; refers to the effect of the fire on the dominant overstory vegetation, which is coniferous trees on the Flathead National Forest. Three levels of fire severity are recognized:

- **High severity** Greater than 75 percent of the dominant overstory vegetation are killed. Also referred to as stand-replacement or stand-replacing fire.
- **Moderate severity** 35 to 75 percent of the dominant overstory vegetation are killed.
- **Low severity** Less than 35 percent of the dominant overstory vegetation are killed

In addition, **mixed-severity fire** refers to a fire event or an area where a broad mix of low, moderate, and high fire severity burn conditions occur.

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

fire-adapted ecosystem An ecosystem in which the organisms (i.e., the plants and animals) are adapted to fire as it functions under the natural fire regime. These ecosystems are resilient to fire and dependent on the resulting ecological effects of fire to sustain the natural diversity of vegetation conditions and animal species.

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

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

fish passage A structure that provides clear access for migrating fish through a potential barrier.

flame length The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface); an indicator of fire intensity (NWCG, 2017).

Flathead River Basin The watershed consisting of all three forks of the Flathead River in Montana

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

food/wildlife attractant storage special order A legal notice regarding the use and storage of wildlife attractants on National Forest System lands designed to reduce wildlife-human conflict.

forage The browse and non-woody plants available to livestock or wildlife for feed.

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

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

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

forest health The perceived condition of a forest derived from factors such 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: Perceptions and interpretations 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 that is at least 10 percent occupied by forest trees of any size, or that formerly had such tree cover, and is not currently developed for non-forest uses. Lands developed for non-forest use include areas for crops, improved pasture, residential or administrative sites, improved roads of any width and adjoining road clearings, and power line clearings of any width.

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

forest plan A document that guides sustainable, integrated resource management of the resources within a plan area and within the context of the broader landscape, giving due consideration to the relative values of the various resources in particular areas (36 § CFR 219.1(b)). Consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531), the Forest Service manages National Forest System 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 Service Handbook The principal source of specialized guidance and instruction for carrying out the direction issued in the Forest Service Manual. Specialists and technicians are the primary audience of handbook direction. Handbooks may also incorporate external directives with related U.S. Department of Agriculture and Forest Service directive supplements.

Forest Service Manual Contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities.

forest size class A classification of the predominant diameter class of live trees within a setting. As used for the vegetation analysis and direction associated with this forest plan, it is a classification of the mean diameter at breast height calculated as either quadratic mean diameter or basal area-weighted average diameter. Quadratic mean diameter is the diameter of a tree with the average basal area. Basal area-weighted average diameter is the average diameter of the live trees weighted by their basal area. Basal area weighted average diameter is less influenced by small trees than quadratic mean diameter. Although the quadratic mean diameter is larger than the arithmetic mean diameter of a stand, it is less than the basal area-weighted average diameter.

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

fuel management An act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives (NWCG, 2017).

fuel reduction The manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

fuel treatment The manipulation or removal of dead or live plant materials to reduce the likelihood of ignition, fire intensity, or rate of spread and/or designed to lessen potential damage/mortality of trees and resistance to fire control. Example treatments include lopping, chipping, crushing, understory tree removal, thinning, piling, and prescribed burning. May or may not provide commercial forest products (NWCG, 2017).

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

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

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

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

gradient (stream) The slope of a streambed.

grazing allotment A designated area of land that is available for livestock grazing and is represented on a map. A grazing allotment can include National Forest System and non-National Forest System lands. Permits are issued for the use of allotments or portions of allotments. Allotments may be

- **active** Livestock grazing allotments that are in use, including pack and saddle stock allotments.
- **closed** Areas having suitable livestock range that have been closed to livestock grazing by administrative decision or action.
- **combined** An allotment that has been combined into another allotment and therefore no longer exists as an independent allotment.
- **vacant** An allotment that does not have a current grazing permit issued. (Forest Service Manual 2205).

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

greenline vegetation The concept of the “greenline” as a location to sample and monitor streamside vegetation was presented by Winward (2000), who described it as “the first perennial vegetation . . . on or near the water’s edge.” The greenline is a useful location for measuring vegetation along streams because it is the dynamic interface of the stream and terrestrial ecosystems.

Grizzly Bear Conservation Strategy A document published by the U.S. Fish and Wildlife Service that describes the regulatory framework for management of the Northern Continental Divide Ecosystem grizzly bear population and its habitat upon recovery and subsequent removal from the Federal list of threatened and endangered species. Strategies have also been prepared for other ecosystems.

grizzly bear-human conflict An interaction between a grizzly bear and a 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. [NCDE]

groundcover The material that is located on the soil surface and includes understory vegetation, forest litter, and woody material

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

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

group selection harvest A tree-cutting method designed to create and maintain an uneven-aged stand by the removal of small patches of trees (generally less than one acre in size) at periodic intervals to meet a predetermined goal of size distribution and species composition within the stand. See also **uneven-aged harvest** and **selection harvest**.

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

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

habitat connectivity See **connectivity**.

habitat security See **security habitat**.

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 Flathead National Forest, habitat types are based upon Pfister et al. (1977). See also **potential vegetation type/potential vegetation group**.

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 that may or may not be detectable. Failures result in accidents only if they strike a target.

health In the context of forest management, health is a description of the general condition of the forest or individual tree. Good health is the state of being free from insect, disease, injuries, or other factors that would adversely impact the functional capabilities of the forest or tree.

heritage resource See **cultural resource**.

hibernaculum (plural: hibernacula) A shelter occupied in the winter by a dormant animal, such as a bat, insect, or marmot.

highway All roads that are part of the National Highway System (23 CFR 470.107(b)).

historic property Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria (Forest Service Manual 2360.5).

home range The area to which an individual animal restricts most of its usual activities. Intruders may or may not be excluded from the area.

hydrologic unit code A sequence of numbers or letters that identify a hydrological feature such as a river, river reach, lake, or drainage basin (also called watershed).

hydrologically stable road A road that has been essentially stormproofed through a series of proactive steps and activities so that further maintenance will not be needed and significant erosion will not occur.

improvement of recreation sites Can include but is not limited to installation or repair of toilets, replacement and/or installation of picnic tables and fire rings, alignment of parking spaces, planting of vegetation, installation or replacement of bulletin boards, and installation of food storage boxes.

infestation A large number of organisms (e.g., insects, invasive species) that cause substantial impacts (generally considered negative) to an area or resource.

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

integrated pest management A pest (in this context, an invasive species) control strategy based on the determination of an economic, human health, or environmental threshold that indicates when a pest population is approaching the level at which control measures are necessary to prevent a decline in the desired conditions (economic or environmental factors). In principle, integrated pest management is an ecologically based holistic strategy that relies on natural mortality factors such as natural enemies, weather, and environmental management and seeks control tactics that disrupt these factors as little as possible. Integrated pest management techniques are defined within four broad categories: (1) biological, (2) cultural, (3) mechanical/physical, and (4) chemical (Forest Service Manual 2900).

integrity (ecology) See **ecological integrity**.

interagency consultation A process required by section 7 of the Endangered Species Act whereby Federal agencies proposing activities that may affect a listed species or critical habitat confer with the U.S. Fish and Wildlife Service about the impacts of the activity on the species (50 CFR 402).

interdisciplinary team A group of Forest Service land use and resource specialists who are responsible for developing the forest plan and environmental impact statement and for making recommendations to the responsible official.

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, and improvement cuts. A forested stand remains following harvest, though tree density will vary depending on management objectives for the site.

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

invasive species An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: plants, vertebrates, invertebrates, and pathogens (Executive Order 13112). All State- and county-listed noxious weeds are considered invasive plants. In addition, other exotic species that are not listed but can successfully outcompete native plants and displace native plant communities are termed invasive species.

inventoried roadless areas Areas mapped under the 2001 Roadless Area Conservation Rule (36 CFR 294 Subpart B, 66 Fed Reg. 3244-3273). These areas are identified on figures B-25 and B-26. The official set of maps is maintained at the national headquarters office of the Forest Service.

karst Terrain created by the chemical solution of the bedrock, including carbonate rocks, gypsum, and to a minor extent other rocks, and characterized by disrupted surface drainage, abundant enclosed depressions, and a well-developed system of underground drainage systems, which may include caves. The term “pseudokarst” is sometimes used to distinguish karst terrain formed on non-carbonate bedrock.

karst resources The elements of a karst landscape, commonly characterized by losing streams (streams that lose water as they flow downstream), sinkholes, collapse features, caves, or springs. These may be physical features but may also relate to karst groundwater systems, system(s) function, and biological significance to the vegetative, wildlife, and aquatic communities.

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

labor income All compensation that is a return to work effort. This includes labor earnings, employer-provided benefits, taxes paid to government on behalf of employees, and the labor portion of entrepreneurial income.

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

land management plan See **forest plan**.

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

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

late-successional stage/seral 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 Flathead National Forest, this stage may begin to develop 140 years or more after the disturbance. Forest structures can be very diverse, with a wide range in densities, number of canopy layers, and tree sizes. Usually, larger trees are dominant (> 16 inches diameter at breast height).

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

livestock A type of domestic animal raised for commercial production purposes, e.g., cattle. Small livestock refers to animals smaller than a cow, such as sheep, goats, and llamas.

lynx critical habitat An area designated by the USFWS that provides the physical or biological features essential to the conservation of the Canada lynx (50 CFR Part 402 Federal Register / Vol. 81, No. 28 / Thursday, February 11, 2016 / Rules and Regulations), as described in 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule (USFWS, 2014).

maintain (ecological context) To keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending upon the circumstances, ecological conditions may be maintained by active or passive management or both. Maintain does not mean to keep the status quo.

maintain (social context) To keep in existence or continuance of the desired recreation opportunities and settings that reflect the physical, managerial, and social settings of the desired recreation opportunity spectrum class. In recommended wilderness areas, facilities, trails, and visitor use should be managed to preserve and protect wilderness characteristics. Maintain does not mean to keep the status quo.

managed watershed See **reference vs. managed watershed**.

management area A land area identified within a planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR § 219.19). The Flathead National Forest plan has seven designated management area

categories (numbered 1 through 7) across the Forest. Most are further divided into subcategories (indicated by a through d, as appropriate).

Management areas on the Flathead National Forest

1a Designated wilderness
1b Recommended wilderness
2a Designated wild and scenic rivers
2b Eligible wild and scenic rivers
3a Administrative areas
3b Special areas
4a Research
4b Experimental and demonstration forests natural area
5a Backcountry nonmotorized year-round
5b Backcountry motorized year-round, wheeled vehicle use only on designated roads, trails, and areas
5c Backcountry motorized over-snow vehicle opportunities (on designated routes and areas)
5d Backcountry wheeled vehicle use on designated roads, trails, and areas April 1 to Nov. 30
6a General forest low-intensity vegetation management
6b General forest medium-intensity vegetation management
6c General forest high-intensity vegetation management
7 Focused recreation areas

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

mass wasting The geomorphic process by which soil, sand, regolith, and rock move downslope, typically as a mass, largely under the force of gravity.

mature tree A tree that has achieved its maximum or near-maximum mean annual rate of growth in height or diameter.

mbf and **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 board 1 foot wide and 1 inch thick.

mcf and **mmcf** (thousand cubic feet and million cubic feet, respectively) A unit of measure for the volume of forest products; one cubic foot is represented by a cube with sides one foot in length.

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 in 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 transport (mechanical transport) Travel using a contrivance for moving people or material in or over land, water, or air, having moving parts, that provides a mechanical advantage to the user, and that is powered by a living or nonliving power source. This includes, but is not limited to, sailboats, hang gliders, parachutes, bicycles, game carriers, carts, and wagons. It does

not include wheelchairs when used as necessary medical appliances. It also does not include skis, snowshoes, rafts, canoes, sleds, travois, or similar primitive devices without moving parts (Forest Service Manual 2320.5(3)).

mesic A type of habitat that is moderately moist.

metropolitan area An urban area that has a population of more than 50,000.

micropolitan area An urban area that has a population of 10,000 to 49,999.

mid-successional stage/seral 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 Flathead National Forest, 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 at breast height.

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

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

- Locatable minerals: Commodities such as gold, silver, copper, zinc, nickel, lead, platinum, etc., and some nonmetallic minerals such as asbestos, gypsum, and gemstones.
- Salable minerals: Common varieties of sand, stone, gravel, cinders, clay, pumice, and pumicite.
- Leasable minerals: Commodities such as oil, gas, coal, geothermal resources, and deposits of potassium, sodium phosphates, oil shale, sulfur, and solid minerals on lands acquired through the Mineral Lands Leasing Act of 1920, as amended; the Geothermal Steam Act of 1970, as amended; or the Acquired Lands Act of 1947, as amended.

minimum impact suppression tactics The application of strategy and tactics that effectively meet wildland fire suppression and resource objectives with the least environmental, cultural, and social impacts.

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

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 source. This includes but is not limited to such machines as chainsaws, 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 over-snow vehicle use An activity involving a motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis while in use over snow (36 CFR § 212.1, Definitions).

motorized route A National Forest System road or trail that is designated for motorized use on a motor vehicle use map pursuant to 36 CFR § 212.51.

motorized travel Includes both wheeled and over-snow vehicles.

motorized use The designation of roads, trails, and areas that are open to motor vehicle use on National Forest System lands as specified in Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005 and in 36 CFR §§ 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. [NCDE]

multiple use The management of the various renewable surface resources of the National Forest System lands so that they are utilized in the combination that will best meet the needs of the American people, making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Some lands will be used for less than all of the resources. Multiple-use management is characterized by harmonious and coordinated management of the various resources without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (see 16 U.S.C. 528–531).

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

National Register of Historic Places The official list of the Nation's historic places worthy of preservation. On the Forest, five historic properties are currently listed in the National Register of Historic Places: Hornet Lookout, Flathead National Forest Backcountry Administrative Facilities Historic District, the South Fork Phone Line, the Wurtz Homestead, and Big Creek Ranger Station Historic District.

native species An organism that was historically or is presently in a particular ecosystem as a result of natural migratory or evolutionary processes, 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 A description of the pattern (e.g., frequency, intensity, area affected, distribution) of disturbances that shape an ecosystem over a long time frame and broad spatial scale. Understanding the natural disturbance regime of an ecosystem can help scientists and practitioners better understand and manage the factors that affect ecosystem structure and function.

natural range of variation The variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application. In contrast to the generality of historical ecology, the natural range of variation concept focuses on a distilled subset of past ecological knowledge developed for use by resource managers; it represents an explicit effort to incorporate a past perspective into management and conservation decisions. The pre-European influenced reference period considered should be sufficiently long, often several

centuries, to include the full range of variation produced by dominant natural disturbance regimes such as fire and flooding and should also include short-term variation and cycles in climate. The natural 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 (Forest Service Handbook 1909.12).

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

NCDE Coordinating Committee See **Northern Continental Divide Ecosystem Coordinating Committee**.

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

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.

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

non-denning 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. [NCDE]

non-point source pollution A discharge to a waterbody from a diffuse source, such as polluted runoff from an agricultural area or precipitation.

Nordic skiing See **Cross-country skiing**.

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. [NCDE]

Northern Continental Divide Ecosystem (NCDE) Coordinating Committee An interagency group that evaluates implementation of the Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy, promotes the exchange of data and information about the Northern Continental Divide Ecosystem 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. [NCDE]

Northern Continental Divide Ecosystem (NCDE) food/wildlife attractant storage order See **food/wildlife attractant storage special order**.

Northern Region The USDA Forest Service Northern Region encompasses 25 million acres and is spread over five States. The region includes 12 national forests located in northeastern Washington, northern Idaho, and Montana as well as the national grasslands in North Dakota and northwestern South Dakota.

noxious weed A legal term; an exotic plant species established or introduced into an area, regulated by law, that is typically aggressive, difficult to manage, and invasive. Noxious weeds may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses.

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

old forest See **old growth**.

old growth An ecosystem or community of forest vegetation that is distinguished by old trees and related structural attributes. This term is deliberately defined generically, and when used as such does not imply a specific quantity of such features as large trees and downed logs, a specific age of old trees, or specific characteristics associated with other structural components. These characteristics vary substantially by ecological regions, forest types, local conditions, literature source, and a host of other factors. See also **old-growth forest**.

old-growth-associated species The group of wildlife species that is associated with old-growth forest.

old-growth forest A community of forest vegetation that is distinguished by large, old trees and related structural attributes occurring at levels that meet descriptions of old-growth forest types for the USDA Forest Service Northern Region (Green et al., 2011). The primary measurable criteria that define old-growth forest in the Northern Region are basal area, trees per acre, size (d.b.h.), and age. Associated structural attributes for determining old-growth forest include the amount of dead/broken tops and decayed trees, amount and size of downed wood, and number of canopy layers (canopy layer diversity). Old-growth forest provides habitat for old-growth-associated species, with verification of habitat conditions occurring at the project-level. Green et al. provide direction on the use and application of the old-growth forest definitions at the project level (see pp. 11-12). Refer to appendix C of the forest plan for more information on how to appropriately apply the definitions and forest plan direction related to old-growth forest at the project level.

open motorized route density A moving window analysis calculation that applies to the primary conservation area portion of the Northern Continental Divide Ecosystem and includes Federal, State, and tribal roads and motorized trails that are open to wheeled motor vehicle use by the public for any part of the non-denning season. *Note:* Motorized routes closed only by sign or order are considered to be open for purposes of this calculation. [NCDE] See also **moving window analysis**.

opening (related to the maximum opening size standard in the plan for a timber harvest) An opening is a forest patch in a seedling size class created as a result of one even-aged harvest operation (i.e., clearcut, seedtree, or shelterwood seed cutting). Large trees left to meet other desired conditions are not counted in the calculation of size class for determining the seedling classification. Adjacent seedling stands created as a result of an earlier harvest operation or due to natural disturbance are not considered part of an opening.

outfitting Renting on, or delivering to, National Forest System lands for pecuniary remuneration or other gain any saddle or pack animal, vehicle, boat, camping gear, or similar supplies or equipment (36 CFR § 251.51).

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

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

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

permit A special-use authorization that provides permission, without conveying an interest in land, to occupy and use National Forest System land or facilities for specified purposes and is both revocable and terminable (36 CFR § 251.51).

phenotypically blister rust resistant Having the appearance of being genetically resistant to blister rust, a non-native disease affecting all five-needled pines (western white pine and whitebark pine, on the Flathead National Forest). This does not mean the tree must be completely free of any observable blister rust infections, but any infections should be relatively minor.

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

plan area The National Forest System lands covered by a forest plan.

pole A tree between 5 and 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, moisture regimes, and soil characteristics. This biophysical environment influences the vegetation characteristics and ecosystem processes of the ecosystem. See also **broad potential vegetation type**.

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

prescribed burning or prescribed fire A fire ignited via management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and National Environmental Policy Act requirements (where applicable) must be met prior to ignition (NWCG, 2017).

prevention measures Pertaining to invasive species management programs, these include a wide range of actions and activities to reduce or eliminate the chance of an invasive species entering or becoming established in a particular area. Prevention activities can include projects for education and awareness as well as more traditional prevention activities such as vehicle and equipment cleaning, boat inspections, or native plant restoration plantings. Restoration activities typically prevent invasive species infestations by improving site resilience and reducing or eliminating the

conditions on a site that may facilitate or promote invasive species establishment (Forest Service Manual 2900).

primary conservation area An area identified in the Northern Continental Divide Ecosystem 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 Northern Continental Divide Ecosystem's grizzly bear recovery zone identified in the draft Grizzly Bear Recovery Plan (USFWS, 1993).

productivity The capacity of National Forest System lands and their ecological systems to provide 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 National Forest System lands identified by location, tasks, outputs, effects, times, and responsibilities for execution (36 CFR § 219.19).

project (in grizzly bear habitat in the Northern Continental Divide Ecosystem) For purposes of the motorized access standards and guidelines in the primary conservation area of the Northern Continental Divide Ecosystem, refers to any temporary activity requiring construction of new roads, temporary roads, reconstruction or opening of restricted roads during the non-denning 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. [NCDE]

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 plan 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. The 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 plan 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. It includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components and is also based on the planning unit's fiscal capability and organizational capacity. The projected wood sale quantity is not a target nor a limitation on harvest, and it is not an objective unless the responsible official chooses to make it an objective in the plan.

proposed action A project, activity, or action that a Federal agency aims to implement or undertake and that 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 through the Federal Register by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to be listed for protection under section 4 of the Endangered Species Act.

rate of spread See **spread rate**.

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

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

record of decision A concise public document that records a Federal agency's decision(s) concerning a proposed action for which the agency has prepared an environmental impact statement (see Council on Environmental Quality and Department of Energy National Environmental Policy Act regulations at 40 CFR 1505.2 and 10 CFR 1021.315, respectively).

recovery The improvement in the status of a listed species to the point at which its listing as federally endangered or threatened is no longer appropriate (36 CFR § 219.19). This definition is for the purposes of the land management planning regulation at 36 CFR § 219 and Land Management Planning Handbook 1909.12 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 National Forest System lands that is ecologically, economically, and socially sustainable for present and future generations. See also **sustainable recreation**.

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

recreation opportunity 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 as follows:

1. **primitive** The primitive recreational opportunity spectrum setting is large, remote, wild, and predominantly unmodified landscapes. There is no motorized activity and little probability of seeing other people. Primitive recreational opportunity spectrum settings are managed for solitude away from roads, people, and development. There are few, if any facilities or developments. Most of the primitive recreational opportunity spectrum settings coincide with designated wilderness boundaries.
2. **semiprimitive nonmotorized** The semiprimitive nonmotorized recreational opportunity spectrum settings include areas of the forest managed for nonmotorized use. Mountain bikes and other mechanized equipment are often present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area. These settings are not as vast or remote as the primitive recreational opportunity spectrum settings, but they offer opportunities for exploration, challenge, and self-reliance.
3. **semiprimitive motorized** The semiprimitive motorized recreational opportunity spectrum settings area(s) of the forests are managed for backcountry motorized use on designated routes. Routes are designed for off-highway vehicles and other high-clearance vehicles. This

setting offers visitors motorized opportunities for exploration, challenge, and self-reliance. Mountain bikes and other mechanized equipment are also sometimes present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area or providing portals to adjacent areas of primitive, or semiprimitive, nonmotorized areas.

4. **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 semiprimitive motorized, semiprimitive nonmotorized and primitive areas.
5. **rural** The rural settings represent the most developed recreation sites and modified natural settings. Facilities are designed primarily for user comfort and convenience.
6. **urban** The urban setting is characterized by a substantially developed environment, although the background may have natural-appearing elements. A highly developed ski resort is an example of an urban setting on National Forest System land.

recreation opportunity spectrum A classification tool that provides a framework for defining the types of outdoor recreation opportunities the public might desire and identifies which portion of the spectrum a given national forest might be able to provide. The recreation opportunity spectrum is used to provide visitors with varying challenges and outdoor experiences. Travel management decisions are separate, project-level decisions that determine the specific areas and routes for motorized recreation consistent with areas identified in the plan as suitable for motorized recreation use. Just because an area is suitable for motorized use, does not mean motorized use is allowable everywhere in that setting.

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

recreation site A defined public recreation area.

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 continue for a duration longer than 48 consecutive hours. [NCDE]

reference vs. managed watershed A watershed is considered “reference” if it has not been grazed by livestock in the last 30 years, road densities are less than 0.5 kilometer per square kilometer, riparian road densities are less than 0.25 kilometer per square kilometer, and there has not been any historic dredge or hardrock mining in riparian areas. Typically, this is a wilderness watershed. All other watersheds are considered “managed.”

reforestation The renewal of forest cover by planting of seedlings, seeding, or natural means (such as seed produced from existing trees on the site).

refugium (plural: refugia) An area that a population of organisms can inhabit and survive a period of unfavorable conditions, such as climate change. The area may serve as a center of relict forms from which a new dispersion and speciation may take place after climatic readjustment.

regeneration The renewal of a forest, whether by natural or artificial means. Natural regeneration creates a new generation (age class) of trees by natural seeding, sprouting, suckering, or layering. Artificial regeneration creates a new age class of trees by planting of seedling trees or seeding (by hand, helicopter, etc.). This term may also apply specifically to the new generation of trees that exists on a site.

regeneration harvest The cutting of trees for the purpose of initiating a new seedling cohort (age class) of trees. Primary even-aged regeneration methods are clearcutting, seedtree and shelterwood. Primary uneven-aged harvest methods are group or individual tree selection. Also may be referred to as regeneration method.

Region 1 See **Northern Region**.

regulated timber harvest See **scheduled timber harvest**.

rehabilitation (of dispersed recreation sites) Management activities to reduce human impacts on a site that has been damaged; can include, but is not limited to, hardening of site, use of natural or manmade barriers to deter site growth and/or access, planting vegetation, modifying slope access to site,

reserve tree A live tree that is left in place within timber harvest areas and not removed during the harvest operation. Reserve trees are left to serve multiple purposes as determined at the site-specific level, such as providing seed for forest regeneration, maintaining a very large tree component and wildlife habitat values, helping to meet scenic integrity objectives, contributing to forest structural diversity, and serving as replacement snags.

resilience (ecology) The capacity of an organism, community, or ecosystem to maintain or regain normal function and development following one or more disturbances.

resistance (ecology) The ability of an organism, population, community, or ecosystem to remain unchanged by withstanding perturbations (such as fire or drought) without significant loss of structure or function.

responsible official The official with the authority and responsibility to oversee the planning process and to approve a plan, plan amendment, and plan revision.

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

riparian area A three-dimensional ecotone of interaction that includes terrestrial and aquatic ecosystems that extend into the groundwater, above the canopy, 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 Riparian management zones are areas adjacent to perennial and intermittent streams, wetlands, ponds, lakes, and reservoirs, as defined by standard FW-STD-RMZ-01.

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

road A motor vehicle route more than 50 inches wide, unless identified and managed as a trail (36 CFR 212.1, Forest Service Manual 7705):

decommissioned: An unneeded road that has been stabilized and restored to a more natural state (36 CFR § 212.1). Decommissioned roads do not count towards total motorized route density as long as they meet the definition of impassable.

forest road or trail: A route wholly or partly within or adjacent to and serving National Forest System lands that is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources (36 CFR § 212.1 – Definitions).

impassable: A road that has been treated in such a manner that the road is blocked and there is little resource risk if road maintenance is not performed on a regular basis (self-maintaining). These roads are not counted in the total motorized route density as long as the road (generally the first 50 to 300 feet) has been treated to make it inaccessible to wheeled motorized vehicles during the non-denning season. Roads may become impassable due to a variety of causes, including but not limited to one or more of the following: natural vegetation growth, road entrance obliteration, scarified ground, fallen trees, boulders, or culvert or bridge removal. Impassable roads may remain on the inventoried road system if use of the road is anticipated at some point in the future. Some, but not all, roads placed in intermittent stored service may be impassable. [NCDE]

intermittent stored service/intermittent service road, closed to traffic: The road is in a condition such that there is little resource risk if maintenance is not performed.

maintenance level: The level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (Forest Service Handbook 7709.59, 62.32):

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

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

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

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

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

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

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

restricted: Roads, or segments thereof, may be restricted to use by certain classes of vehicles or types of traffic as provided in 36 CFR part 261.

road management objectives Road management objectives document the intended purpose of an individual road in providing access to implement a land and resource management plan as well as decisions about applicable standards for the road. Road management objectives should be based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria.

roadless area characteristics Resources or features that are often present in and characterize inventoried roadless areas. These include

- high-quality or undisturbed soil, water, and air;
- source of public drinking water;
- diversity of plant and animal communities;
- habitat for threatened, endangered, candidate, proposed, and sensitive species on large areas;
- natural-appearing landscapes with high or very high scenic integrity;
- reference landscapes (the body of knowledge about the effects of management activities over long periods of time and on large landscapes is very limited; reference landscapes of relatively undisturbed areas serve as a barometer to measure the effects of development on other parts of the landscape);
- primitive, semiprimitive nonmotorized, and semiprimitive motorized recreation opportunity classes of dispersed recreation;
- other locally identified unique characteristics; and
- traditional cultural properties and sacred sites.

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. [NCDE]

sacred site A place that has special religious significance to a group.

salable minerals Common varieties of sand, stone, gravel, cinders, clay, pumice, pumicite, etc. The Forest Service has the authority to dispose of these materials on public lands through a variety of methods. The disposal of these materials is discretionary.

salvage harvest A commercial removal (timber harvest) of dead, damaged, or dying trees. Collecting firewood for personal use is not considered salvage harvest.

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

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

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

scenic character A combination of the physical, biological, and cultural images that give an area its scenic identity and contribute 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 Developed in coordination with the recreational settings, managerial direction, and the scenic class that were developed from the scenic inventory.

- very high integrity: The valued scenery appears natural or unaltered. Only minute visual disturbances to the valued scenery, if any, are present.
- high integrity: The valued scenery appears natural or unaltered, yet visual disturbances are present; however, they remain unnoticed because they repeat the form, line, color, texture, pattern, and scale of the valued scenery.
- moderate integrity: The valued scenery appears slightly altered. Noticeable disturbances are minor and visually subordinate to the valued scenery because they repeat its form, line, color, texture, pattern, and scale.
- low integrity: The valued scenery appears moderately altered. Visual disturbances are co-dominant with the valued scenery and may create a focal point of moderate contrast. Disturbances may reflect, introduce, or “borrow” valued scenery attributes from outside the landscape being viewed.

scheduled timber harvest A commercial removal of timber that is planned and conducted using a rotation age (the age planned to harvest timber in the future). Rotation age is determined based on site productivity, site conditions, and forest plan desired conditions. Timber harvest is only scheduled on lands suitable for timber production.

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 Northern Continental Divide Ecosystem primary conservation area 500 meters or more from (1) a route open to public wheeled motorized use during the grizzly bear non-denning 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-the-snow motorized

vehicle routes and areas, and nonmotorized trails are allowed within secure core, unless otherwise restricted (e.g., by other national forest plan direction).

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, tree height up to 5 feet tall.

seedling/sapling A size category for forest stands in which trees less than 5 inches in diameter are the predominant vegetation. Tree heights are typically less than 25 feet.

seedtree harvest A tree-cutting method used to regenerate a stand in which nearly all live trees are removed from an area except for a small number of trees that are left singly or in small groups. Regeneration may be natural or artificial (planting). See also **even-aged regeneration harvest**.

selection harvest A tree-cutting method used to create and maintain an uneven-aged stand by periodically removing some trees within multiple size classes either singly or in small groups or strips. See also **group selection harvest** and **uneven-aged harvest**.

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

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 harvest A tree-cutting method used to regenerate a stand in which some of the trees are left (more trees than with the seedtree method) that provide shade and protection for the regenerating conifer seedlings. This technique may be performed uniformly throughout the stand, in strips, or in groups. Regeneration may be natural or artificial (planting). See also **even-aged regeneration harvest**.

significant cave According to the criteria for significant caves (36 CFR 290.3 (c)), a significant cave on National Forest System lands shall possess one or more of the following features, characteristics, or values.

1. Biota. The cave provides seasonal or yearlong habitat for organisms or animals, or contains species or subspecies of flora or fauna native to caves, or are sensitive to disturbance, or are found on State or Federal sensitive, threatened, or endangered species lists.
2. Cultural. The cave contains historic properties or archeological resources (as defined in Parts 800.2 and 296.3 of this chapter respectively, or in 16 U.S.C. 470, et seq.), or other features

included in or eligible for inclusion on the National Register of Historic Places because of their research importance for history or prehistory, historical associations, or other historical or traditional significance.

3. Geologic/mineralogic/paleontologic. The cave possesses one or more of the following features:
 - (i) Geologic or mineralogic features that are fragile, represent formation processes that are of scientific interest, or that are otherwise useful for study.
 - (ii) Deposits of sediments or features useful for evaluating past events.
 - (iii) Paleontologic resources with potential to contribute useful educational or scientific information.
4. Hydrologic. The cave is a part of a hydrologic system or contains water which is important to humans, biota, or development of cave resources.
5. Recreational. The cave provides or could provide recreational opportunities or scenic values.
6. Educational or scientific. The cave offers opportunities for educational or scientific use; or, the cave is virtually in a pristine state, lacking evidence of contemporary human disturbance or impact; or, the length, volume, total depth, pit depth, height, or similar measurements are notable.

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 the 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.

SIMPPLLE model An abbreviation for Simulating Patterns and Processes at Landscape Scales, this is a model that simulates changes in vegetation on landscapes in response to both natural disturbances and management activities as they interact with climatic conditions. This model was used in the forest plan revision for two purposes: to calculate the natural range of variation for vegetation conditions and to project the vegetation conditions of the alternatives across the Forest into the future for analysis in the environmental impact statement.

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.

size class See **forest size class**.

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, skiing instruction, and trail passes for the use of permittee-maintained ski trails. A ski area may also include ancillary facilities directly related to the operation and support of skiing activities (36 CFR § 251.51).

skid trail A trail through the woods used to access timber for skidding (dragging) to a landing with mechanized equipment (i.e., a rubber-tired skidder) for loading onto log trucks.

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

small livestock See **livestock**.

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

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

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

soil function Any ecological service, role, or task that soil performs, such as (1) soil biological services that provide a medium for roots, fungi, and micro-organisms in the upper sections of the soil, (2) soil hydrology where soil absorbs, stores, and transmits water both vertically and horizontally, (3) nutrient cycling where soil stores, moderates the release of, and cycles nutrients and other elements, (4) carbon storage, (5) physical support for plants where soil has a porous structure to allow passage of air and water, withstand erosive forces, and provide a medium for plant roots, and (6) filtering and buffering to protect the quality of water, air, and other resources.

species of conservation concern A species other than a federally recognized threatened, endangered, proposed, or candidate species that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the plan area (36 CFR § 219.9). More information about species of conservation concern on the Flathead National Forest is available at <http://bit.ly/NorthernRegion-SCC>.

Spectrum model A software modeling system designed to assist decisionmakers in exploring and evaluating multiple resource management choices and objectives. Management actions are applied to landscapes through a time horizon and display resulting outcomes. Management actions are selected to achieve desired goals (desired conditions and objectives) while complying with all identified management constraints (standards and guidelines). This model was used to

estimate potential vegetation treatments and timber product outputs over time for the Flathead plan.

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

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

stand initiation structural stage A phase that occurs in the years immediately following a stand-replacing disturbance. The growing space is being reoccupied by trees, shrubs, forbs and grass species. Because trees are small (i.e., seedlings and saplings) most of the crowns are not touching one another and the trees are free to grow. This stage is typically characterized by highly diverse plant species, especially of species that are shade-intolerant (Oliver & Larson, 1996).

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

stem exclusion structural stage (or closed canopy structural stage) A phase that typically occurs after the stand initiation structural stage, where trees have grown taller, with wider crowns, and have occupied the growing space, creating a closed canopy forest. Because the tree crowns are mostly touching or intertwined, 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 tree establishment is mostly precluded by a lack of sunlight or moisture (Oliver & Larson, 1996).

stocking A measure of timber stand density as it relates to the optimum or desired density for achieving a given management objective.

stormproofing A stormproofed road is one where measures have been taken to upgrade the road so as to minimize the risk and potential magnitude of future erosion and sediment delivery. It generally consists of reducing hydrologic connectivity; identifying and treating potential road failures (mostly fill slope failures) that could fail and deliver sediment to streams; and reducing the risk of stream crossing failures and stream diversion.

stressor (ecology) See **ecosystem stressor**.

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

structure See **forest structure**.

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

subwatershed A 6th level hydrologic unit, as defined in the U.S. Geological Survey hierarchical system of watersheds. Subwatersheds have an average size of 10,000-40,000 acres.

succession 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.

successional stage/seral stage A stage or recognizable condition of a plant community occurring during its development from a relatively unvegetated condition to a mature plant community. See **early-successional stage/early-seral stage**, **mid-successional stage/mid-seral stage**, and **late-successional stage/late-seral stage**.

suitability of lands Specific lands within a plan area will be identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan will also identify lands within the plan area 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. Suitability identifications may be made after consideration of historic uses and of issues that have arisen in the planning process. Every plan must identify those lands that are not suitable for timber production (36 CFR 219.7(e)(1)(v)). The terms suitable and suited and not suitable and not suited can be considered the same.

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

surface erosion Rills, gullies, pedestals, and soil deposition are all indicators of detrimental surface erosion. Minimum amounts of ground cover necessary to keep soil loss to within tolerable limits (generally less than 1 to 2 tons per acres per year) should be established locally depending on site characteristics (Forest Service Manual Supplement No. 2550-2014-1).

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

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

sustained yield limit 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, sec. 11; 16 U.S.C. 1611; 36 CFR § 219.11(d)(6)). The sustained yield limit is the volume that could be produced in perpetuity on lands that *may be suitable* for timber production. Calculation of the sustained yield limit includes volume from lands that are deemed not suitable for timber production based upon compatibility with the desired conditions for those lands. The calculation of the sustained yield limit is not limited by a 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**—**National Forest System**.

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

timber Trees grown for commercial uses, such as in building or carpentry. May also refer to the wood itself, especially when suitable for various building purposes.

timber harvest The removal of trees of sufficient size and quality to furnish raw material for wood fiber and other multiple-use purposes (36 CFR 219.19). A commercial activity with the primary purpose of selling wood products.

timber management The growing of, tending to, commercial harvesting of, and regeneration of crops of trees.

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

total maximum daily load (TMDL) the total maximum daily load is the maximum amount of a pollutant a watershed can receive and still meet water quality standards. See appendix E of the forest plan for additional information on total maximum daily loads.

total motorized route density A moving window analysis calculation that applies to the primary conservation area portion of the Northern Continental Divide Ecosystem and includes Federal, State, and tribal roads and motorized trails that do not meet the definition of an impassable road. [NCDE] See also **moving window analysis**.

traditional cultural property A cultural resource that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. The entity evaluated for eligibility for inclusion in the National Register of Historic Places must be a tangible property, that is, a district, site, building, structure, or object as defined in 36 CFR 64.4 (Forest Service Manual 2360.5).

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

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

trail management objectives Documentation of the intended purpose and management of a National Forest System trail based on management direction, including access objectives.

underburn A fire that consumes surface fuels but not the overstory canopy.

understory The trees and other woody species that 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.

uneven-aged harvest A tree-cutting method with the purpose of creating and maintaining an uneven-aged stand structure. Individuals or small groups of trees are removed to allow room for new seedlings to become established and young trees to grow. See also **regeneration harvest**.

uneven-aged stand A group of trees that differ significantly in age. Generally, there are at least three well-defined (i.e., the spread of ages exceeds 25% of the planned life span) and well-represented age classes, differing in height, age, and diameter. The age classes may occur in a small patch mosaic pattern or as individual trees scattered throughout the stand. Sometimes referred to as “multi-cohort” or “all-aged” stands.

United States Code (U.S.C.) A consolidation and codification by subject matter of the general and permanent laws of the United States.

untrammelled In the context of the Wilderness Act, an area where human influence does not impede the free play of natural forces or interfere with natural processes in the ecosystem.

utilization standards The specifications for merchantable forest products offered in a timber sale.

valid existing rights A legal interest that attaches to a land or minerals estate that cannot be divested from the estate until the interest expires or is relinquished.

vegetation management An activity that changes the composition, structure, or other characteristics of vegetation to meet specific objectives. A variety of vegetation treatments or silvicultural prescriptions may be used, with the most common methods being timber harvest (may be regeneration, intermediate, or salvage harvests), precommercial thinning (i.e., in sapling stands), fuel reduction treatments (may be commercial or noncommercial products), prescribed fire, or tree or shrub planting.

viable population A population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments (36 CFR § 219.19).

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, managed See **reference vs. managed watershed**.

watershed, reference See **reference vs. managed watershed**.

watershed condition The state of a watershed based on physical and biogeochemical characteristics and processes.

watershed condition framework A comprehensive approach to watershed management that proactively implements integrated restoration on priority watersheds on national forests and grasslands. See appendix E of the forest plan for more information.

weighted average Similar to an arithmetic 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 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.

wheeled motorized travel Motorized travel using a wheeled motorized vehicle on terra (ground).

wild and scenic river A waterway designated by Congress as part of the National Wild and Scenic Rivers System, which was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271, 1271–1287).

wilderness An area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131–1136).

wilderness character Untrammeled, undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation and other features and values.

- Untrammeled. The wilderness is essentially unhindered and free from modern human control or manipulation.
- Naturalness. The wilderness ecological systems are substantially free from the effects of modern civilization.
- Undeveloped. The wilderness is essentially without permanent improvements or modern human occupation.
- Outstanding opportunities for solitude or a primitive and unconfined type of recreation. The wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge.
- Other features of value. The wilderness may contain ecological, geological, or other features of scientific educational, scenic, or historical value.

wilderness characteristics Undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation and other features and values.

wilderness inventory area An area determined through the wilderness inventory process in Forest Service Handbook 1909.12 chapter 70 that identifies lands that may be suitable for inclusion in the National Wilderness Preservation System. Lands included in the wilderness inventory were carried forward for evaluation.

wildland fire A non-structure fire, other than prescribed fire, that occurs in the wildland. Any fire originating from an unplanned ignition.

wildland-urban interface Defined by the Healthy Forests Restoration Act § 101 as follows:

- 1) 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

- 2) in the case of any area for which a community wildfire protection plan is not in effect—
- a) an area extending 1/2-mile from the boundary of an at-risk community;
 - b) an area within 1 1/2 miles of the boundary of an at-risk community, including any land that—
 - i) has a sustained steep slope that creates the potential for wildfire behavior endangering the at-risk community;
 - ii) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or
 - iii) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; and
 - c) 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.

The Flathead County Community Wildfire Protection Plan (Suenram, 2011) includes the wildland-urban interface map, accessed at

<https://flathead.mt.gov/fireservice/documents/FlatheadCWPP2011.pdf>.

windthrow A tree or stand of trees that has been blown over by the wind.

winter habitat The portion of the overall area inhabited by an ungulate species where the majority of individuals are found from the first heavy snowfall to spring green-up or during a site-specific period of winter. In the Rocky Mountains, winter habitats for ungulates have a relatively low amount of snow cover.

yarding The operation of hauling trees from their stump (once cut down) to a collecting point.

zone 1 An area surrounding the grizzly bear primary conservation area in the Northern Continental Divide Ecosystem where the intent is to maintain occupancy by grizzly bears but at expected lower densities than inside the primary conservation area. Zone 1 also includes two demographic connectivity areas (Salish and Ninemile). [NCDE]

zone 2 An area adjacent to the grizzly bear zone 1 and/or zone 3 in the Northern Continental Divide Ecosystem where grizzly bears, particularly males, would have the opportunity to move between the Northern Continental Divide Ecosystem 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. [NCDE]

zone 3 The area that primarily consists of areas where grizzly bears do not have enough suitable habitat to support population growth. Grizzly bear occupancy will not be actively discouraged in zone 3, and the management emphasis will be on conflict response. [NCDE]

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Appendix A: Northern Rockies Lynx Management Direction

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Introduction

The habitat direction from the Northern Rockies Lynx Management Direction (NRLMD) is retained in this forest plan through standard FW-STD-WL-04. The forest plan will carry forward the objectives, standards, and guidelines that were developed to conserve lynx. The use of the terms “standards,” and “guidelines” in the NRLMD is consistent with the definitions of these terms found on page 6 of the forest plan. The definition of “objectives” in the NRLMD is consistent with the definition of “desired conditions” found on pages 5-6 of the forest plan. The forest plan thus defines the NRLMD “objectives” as “desired conditions.” The NRLMD plan components in this appendix are incorporated throughout the forest plan (e.g., in the terrestrial ecosystems and vegetation, wildlife species, recreation, and infrastructure sections).

Forest-specific modifications to VEG S6 (to add an exception category aimed at protecting mature rust-resistant whitebark pine trees) and HU G11 (for areas identified as suitable for over-snow motorized recreational vehicle use) are indicated in bold type in VEG S6 and HU G11 in this appendix. These plan components are also replicated in the plan as FW-STD-TE&V-02 and FW-GDL-REC-03 because they were modified.

This appendix applies to lynx habitat on National Forest System lands presently occupied by Canada lynx, as defined by the Amended Lynx Conservation Agreement between the Forest Service (FS) and the U.S. Fish and Wildlife Service (FWS) (USDA FS and USDI FWS 2006a). The Flathead National Forest is listed as occupied lynx habitat.

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 FS signed a Lynx Conservation Agreement with the FWS in 2001. The FS agreed to consider the Lynx Conservation Assessment and Strategy during project analysis and to not proceed with projects that would be “likely to adversely affect” lynx until the forest plans were amended to conserve the lynx. The Lynx Conservation Agreement was renewed in 2005 and again in 2006, when it was extended for five years (until 2011) or until all relevant forest plans had been updated (USDA FS and USDI FWS 2000, 2005, 2006a, 2006b).

In 2007, the Northern Rockies Lynx Management Direction amended the existing forest plans of 18 national forests in Montana, Idaho, Wyoming, and Utah, including the Flathead National Forest. The record of decision was signed by the regional foresters of the USDA Forest Service Northern Region, Intermountain Region, and Rocky Mountain Region on March 23, 2007.¹

The purpose of the NRLMD was to incorporate management direction in forest 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 forest plans.

The NRLMD relied upon the scientific information and recommendations in:

- Ecology and Conservation of Lynx in the United States (Ruggiero et al. 2000), which summarized lynx ecology;

¹ The NRLMD final environmental impact statement and record of decision are available at <https://www.fs.usda.gov/detail/r1/landmanagement/resourcemanagement/?cid=stelprdb5160650>.

- Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000), which recommended conservation measures for activities that could place lynx at risk by altering their habitat or reducing their prey;
- The Canada Lynx Recovery Outline issued by the FWS on Sept. 12, 2005 (USDI Fish and Wildlife Service 2005); and
- Numerous publications cited in the NRLMD final environmental impact statement and record of decision.

Subsequent to adoption of the NRLMD, several key pieces of new information have become available. These include

1. a final rule designating lynx critical habitat prepared by the FWS in 2014²;
2. an update to the Lynx Conservation Assessment and Strategy prepared by the Interagency Lynx Biology Team in 2013³; and
3. additional published scientific information about lynx and lynx habitat.

Monitoring information from the 10 years of implementation of the NRLMD has also been compiled. We considered and addressed this new information in the following ways.

- The forest plan includes additional plan components that affect Canada lynx and their critical habitat, consistent with the 2012 planning rule.
- The final environmental impact statement and the biological assessment for the forest plan describe critical habitat, which is the primary constituent element identified in the FWS's final rule for critical habitat, and analyze the effects of the alternatives on critical habitat unit #3, including the Flathead National Forest.
- A full revision of the LCAS was completed in 2013. The 2013 LCAS states the intent to provide updated information that may serve to inform updates or refinements of existing land management plans (p. 89). The forest plan final environmental impact statement and biological assessment referenced the 2013 LCAS and carefully considered conservation measures that are applicable to core areas.
- New scientific information about lynx and lynx habitat was extensively reviewed and cited in the final environmental impact statement and biological assessment.
- Monitoring information regarding fuels treatment and vegetation management conducted based upon exemptions and exceptions to the standards has been compiled each year since approval of the NRLMD and has been reported to the FWS. Monitoring indicates that the Forest has remained well within the limits required under the terms and conditions of the incidental take statement since the NRLMD was implemented.
- For the Forest's final environmental impact statement and biological assessment, the estimated acres of vegetation management treatments that may occur in lynx habitat were updated to reflect a

² USFWS (2014), Final environmental assessment: Revised designation of critical habitat for the contiguous United States distinct population segment of the Canada lynx, retrieved from <https://www.fws.gov/mountain-prairie/es/canadaLynx.php>.

³ Interagency Lynx Biology Team (2013), Canada lynx conservation assessment and strategy (3rd ed.), USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service, Forest Service Publication R1-13-19, Missoula, MT, retrieved from <https://www.fs.fed.us/biology/resources/pubs/wildlife/index.html>.

15-year time period following implementation of the forest plan. The FWS considered this information in preparing its biological opinion.

The following NRLMD is being incorporated into the Flathead National Forest plan. Changed language in VEG S6 and HU G11 is indicated in bold.

Northern Rockies Lynx Management Direction

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).

GOAL¹⁴

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.

Objective³⁰ ALL O1

Maintain²⁶ or restore⁴⁰ lynx habitat²³ connectivity¹⁶ in and between LAUs²¹, and in linkage areas²².

Standard⁴⁴ ALL S1

New or expanded permanent development³³ and vegetation management⁴⁹ projects³⁶ must maintain²⁶ habitat connectivity¹⁶ in an LAU²¹ and/or linkage area²².

Guideline¹⁵ ALL G1

Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways¹⁸ or forest highways¹² across federal land. Methods could include fencing, underpasses, or overpasses.

Standard⁴⁴ LAU S1

Changes in LAU²¹ 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 projects³⁶ 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.

⁴ Note: In this section, superscript numbers refer to numbered definitions in the glossary.

Objective³⁰ VEG O1

Manage vegetation⁴⁹ 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 cover¹⁹, and high densities of snowshoe hare. Provide winter snowshoe hare habitat⁵¹ in both the stand initiation structural stage and in mature, multi-story conifer vegetation.

Objective VEG O3

Conduct fire use¹¹ activities to restore⁴⁰ ecological processes and maintain or improve lynx habitat.

Objective VEG O4

Focus vegetation management⁴⁹ in areas that have potential to improve winter snowshoe hare habitat⁵¹ but presently have poorly developed understories that lack dense horizontal cover.

Standard⁴⁴ VEG S1

Where and to what this applies: Standard VEG S1 applies to all vegetation management⁴⁹ projects³⁶ that regenerate³⁸ forests, except for fuel treatment¹³ projects³⁶ within the wildland urban interface⁵⁰ (WUI) as defined by HFRA¹⁷, subject to the following limitation:

Fuel treatment projects³⁶ within the WUI⁵⁰ 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 projects³⁶ within the WUI⁵⁰ see guideline VEG G10.

The standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages⁴⁵ 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 projects³⁶.

Standard VEG S2

Where and to what this applies: Standard VEG S2 applies to all timber management⁴⁷ projects³⁶ that regenerate³⁸ forests, except for fuel treatment¹³ projects³⁶ within the wildland urban interface⁵⁰ (WUI) as defined by HFRA¹⁷, subject to the following limitation:

Fuel treatment projects³⁶ within the WUI⁵⁰ 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 projects³⁶ within the WUI⁵⁰ see guideline VEG G10.

The standard: Timber management⁴⁷ projects³⁶ shall not regenerate³⁸ 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 thinning³⁵ projects³⁶, except for fuel treatment¹³ projects³⁶ that use precommercial thinning as a tool within the wildland urban interface⁵⁰ (WUI) as defined by HFRA¹⁷, subject to the following limitation:

Fuel treatment projects³⁶ within the WUI⁵⁰ 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 projects³⁶ within the WUI⁵⁰ see guideline VEG G10.

The Standard: Precommercial thinning projects³⁶ that reduce snowshoe hare habitat may occur from the stand initiation structural stage⁴⁵ 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 studies³⁹ 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 project³⁶ is not likely to adversely affect lynx; or
 - b. that a project³⁶ 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 thinning⁵ 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 habitat⁵¹ 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 management⁴⁹ projects³⁶ except for fuel treatment¹³ projects³⁶ within the wildland urban interface⁵⁰ (WUI) as defined by HFRA¹⁷, subject to the following limitation:

Fuel treatment projects³⁶ within the WUI⁵⁰ 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 projects³⁶ within the WUI⁵⁰ see guideline VEG G10.

The Standard: Vegetation management projects³⁶ that reduce snowshoe hare habitat in multi-story mature or late successional forests²⁹ 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 studies³⁹ or genetic tree tests evaluating genetically improved reforestation stock; or
3. For incidental removal during salvage harvest⁴² (e.g. removal due to location of skid trails).
4. **For noncommercial felling of trees larger than sapling size within 200 feet of whitebark pine trees (in stands that contain trees identified for cone/scion/pollen collection) to make whitebark pine more likely to survive wildfires, more resistant to mountain pine beetle attack, and more likely to persist in future environments.**

Exceptions 2, 3, and 4 shall only be utilized in lynx analysis units 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-aged or even-aged management systems could be used to create openings in coniferous forests in the stem exclusion structural stage where there is little understory so that new forage can grow).

Guideline VEG G1

Vegetation management⁴⁹ projects³⁶ 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 stage⁴⁶ stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat⁵¹ should be near denning habitat⁶.

Guideline VEG G4

Prescribed fire³⁴ 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 squirrel³⁷, should be provided in each LAU.

Guideline VEG G10

Fuel treatment projects³⁶ within the WUI⁵⁰ as defined by HFRA¹⁷ should be designed considering Standards VEG S1, S2, S5, and S6 to promote lynx conservation.

Guideline VEG G11

Denning habitat⁶ 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 projects³⁶

should be designed to retain some coarse woody debris⁴, piles, or residual trees to provide denning habitat⁶ 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.

Objective³⁰ GRAZ O1

Manage livestock grazing to be compatible with improving or maintaining²⁶ lynx habitat²³.

Guideline¹⁵ 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 areas⁴¹ and willow carrs³, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.

Guideline GRAZ G4

In shrub-steppe habitats⁴³, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs²¹, 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 Projects (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.

Objective³⁰ HU O1

Maintain²⁶ the lynx's natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat²³.

Objective HU O2

Manage recreational activities to maintain lynx habitat and connectivity¹⁶.

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 recreation⁹ 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 highway¹⁸ effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity¹⁶, and to reduce the potential of lynx mortality.

Guideline¹⁵ HU G1

When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris⁴, so winter snowshoe hare habitat⁵¹ 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 habitat²³.

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 restores⁴⁰ lynx habitat should be developed.

Guideline HU G6

Methods to avoid or reduce effects on lynx should be used in lynx habitat²³ 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 connectivity¹⁶. New permanent roads and trails should be situated away from forested stringers.

Guideline HU G8

Cutting brush along low-speed²⁵, 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 projects³⁶, public motorized use should be restricted. Effective closures should be provided in road designs. When the project³⁶ 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 habitat¹⁰, if it has been identified as a need.

Guideline HU G11

To provide ecological conditions to support Canada lynx on NFS lands at a forestwide scale, there should be no net increase in miles of designated routes for motorized over-snow vehicle use, groomed routes, or areas where motorized over-snow vehicle use is identified as suitable. The “no net increase” is in comparison to the suitability displayed in forest plan figure B-11.

This guideline 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.

Guideline HU G12

Winter access for non-recreation special uses and mineral and energy exploration and development, should be limited to designated routes⁸ or designated over-the- snow routes⁷.

Linkage Areas (LINK)

The following objective, standard, and guidelines apply to all projects within linkage areas in occupied habitat, subject to valid existing rights.

Objective³⁰ 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.

Standard⁴⁴ LINK S1

When highway¹⁸ or forest highway¹² construction or reconstruction is proposed in linkage areas²², identify potential highway crossings.

Guideline¹⁵ LINK G1

NFS lands should be retained in public ownership.

Guideline LINK G2

Livestock grazing in shrub-steppe habitats⁴³ should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages²⁸, similar to conditions that would have occurred under historic disturbance regimes.

Required Monitoring

Note: This section has been updated to reflect required monitoring required from the USFWS biological opinion for the Flathead National Forest's forest plan⁵, as follows:

The biological assessment prepared for each site-specific project shall include a report of the acres to be treated under the exemptions and/or exceptions from the vegetation management standards VEG S1, S2, S5, and S6. The report shall also include the total acres treated to date on the Flathead National Forest as a whole, a map indicating the spatial distribution of past treatments, and acres treated by LAU. This total shall include the acres in the proposed project, other projects that have signed decisions (including those that have been completed since implementation of NRLMD in 2007), and those projects that have completed section 7 consultation.

- a. In addition, each biological assessment shall report whether or not the site-specific project meets all applicable revised forest plan guidelines for lynx. If guidelines were not met, provide rationale as to why they could not be met.
- b. Each project level biological assessment shall report any three adjacent lynx analysis units (LAUs) within the action area that have more than 30 percent of lynx habitat in a stand initiation structural state that does not yet provide winter snowshoe hare habitat, either because of natural events, vegetation management or fuel treatment projects, or any combination of these or other causes.
- c. Report by LAU the amount of lynx habitat treated through vegetation management projects as allowed by exceptions to VEG S5 and S6; record the type of exception, acres, location (LAU) and whether or not standard VEG S1 was adhered to.
- d. The FNF shall report this project level monitoring information at the time a site-specific decision is signed to the designated Forest Service office with responsibility for maintaining an accurate accounting of reports. These data will be provided in a biennial report to the USFWS's Montana Ecological Services Office by April 1st.

⁵ USFWS. (2017). Biological opinion for the revised forest plan--Flathead National Forest. Helena, MT: U.S. Fish & Wildlife Service, Ecological Services, pp. IV-93-94. Retrieved from www.fs.usda.gov/goto/flathead/fpr.

Glossary for Appendix A

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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Note: This is the complete reference list from the NRLMD record of decision. Not all works in this list are cited in this appendix.

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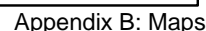
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Appendix B: Maps

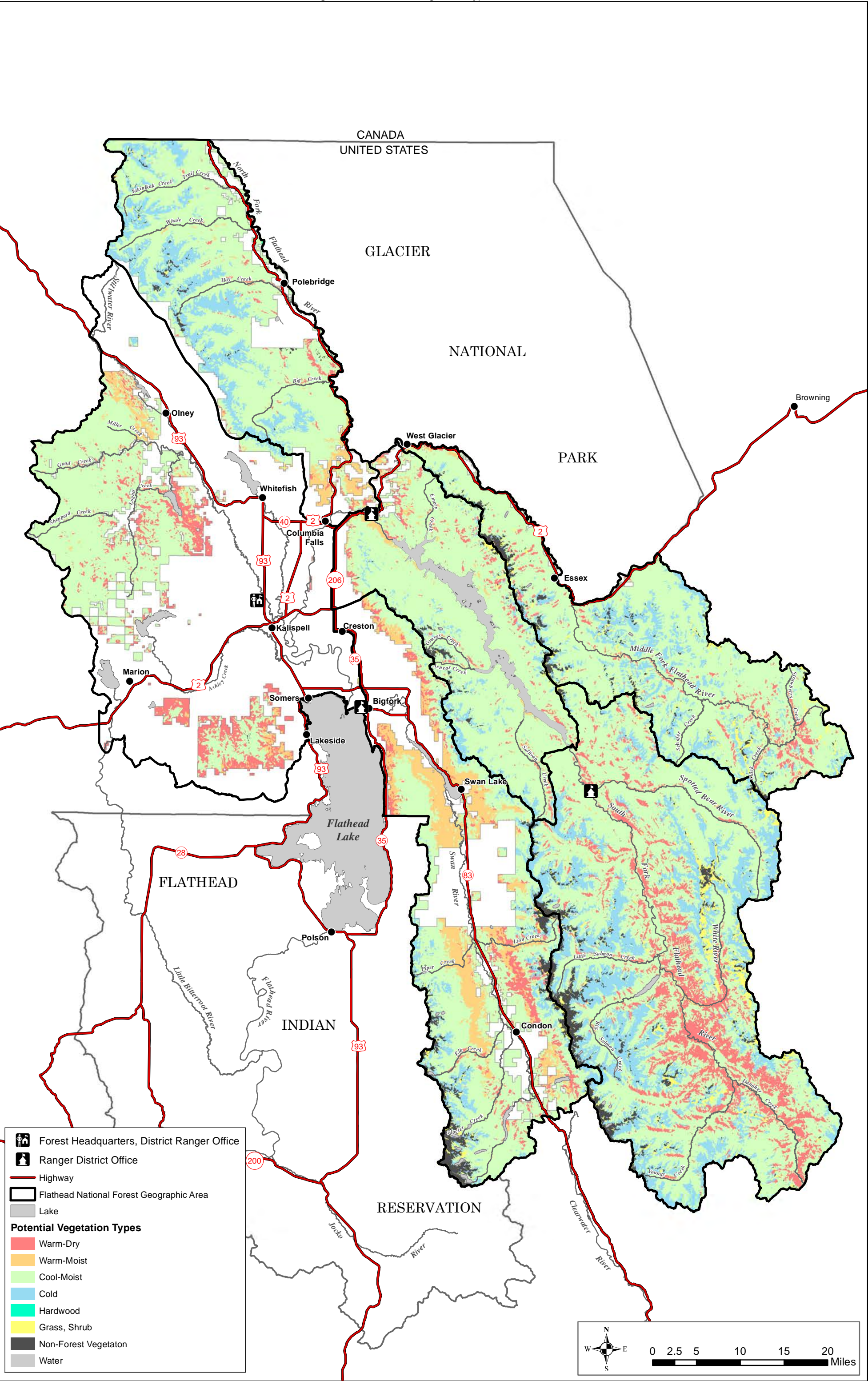
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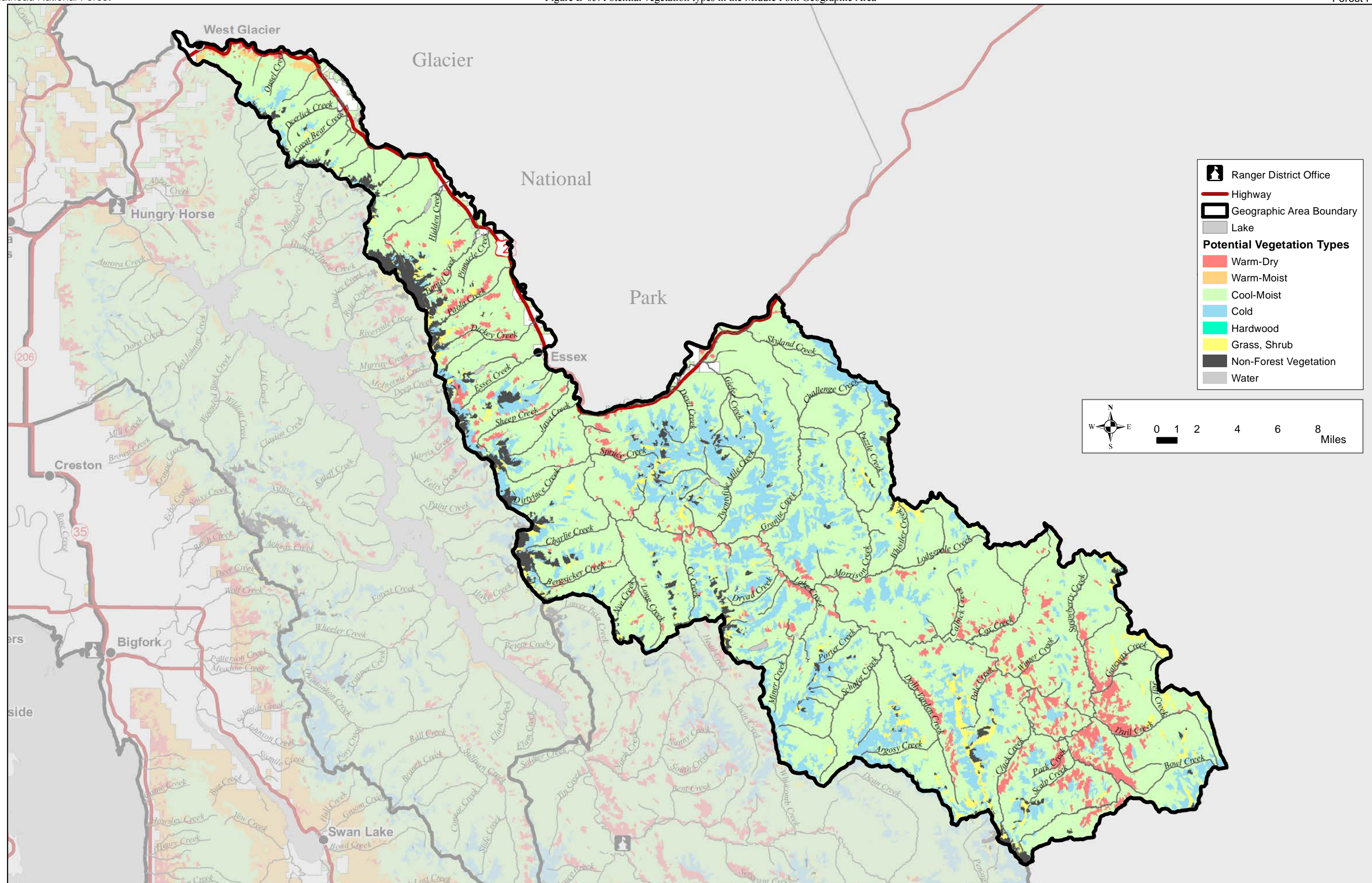
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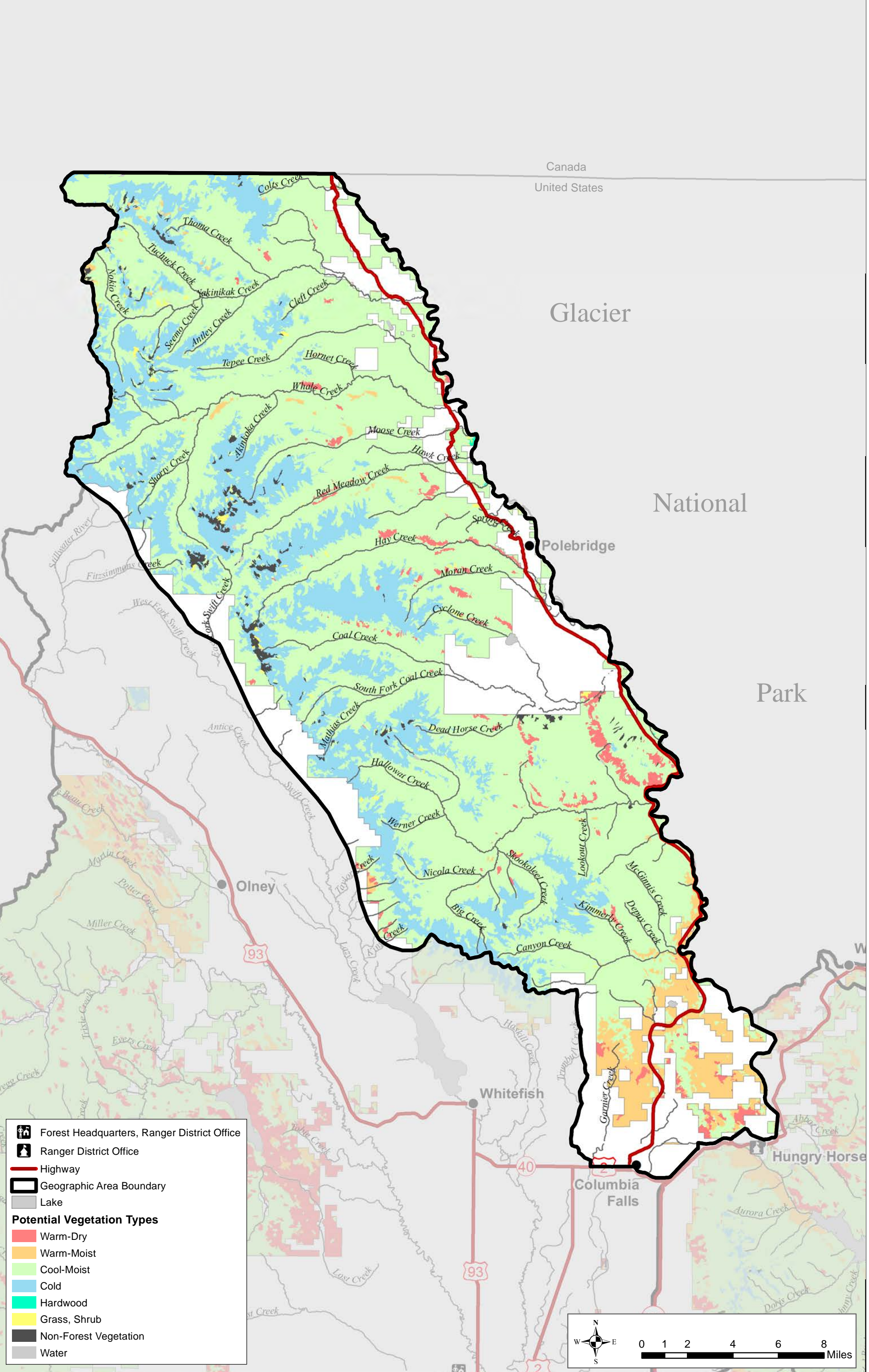


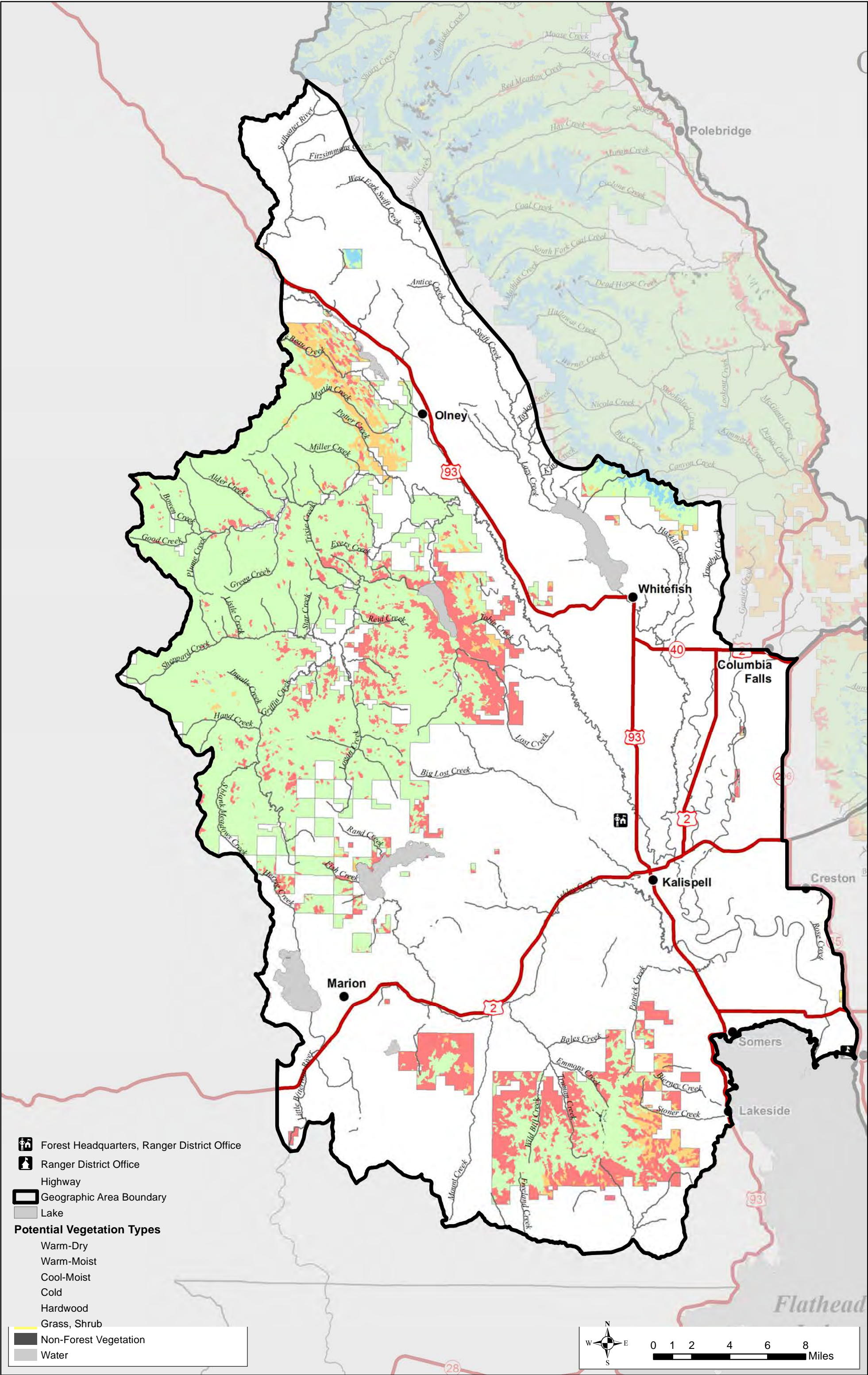


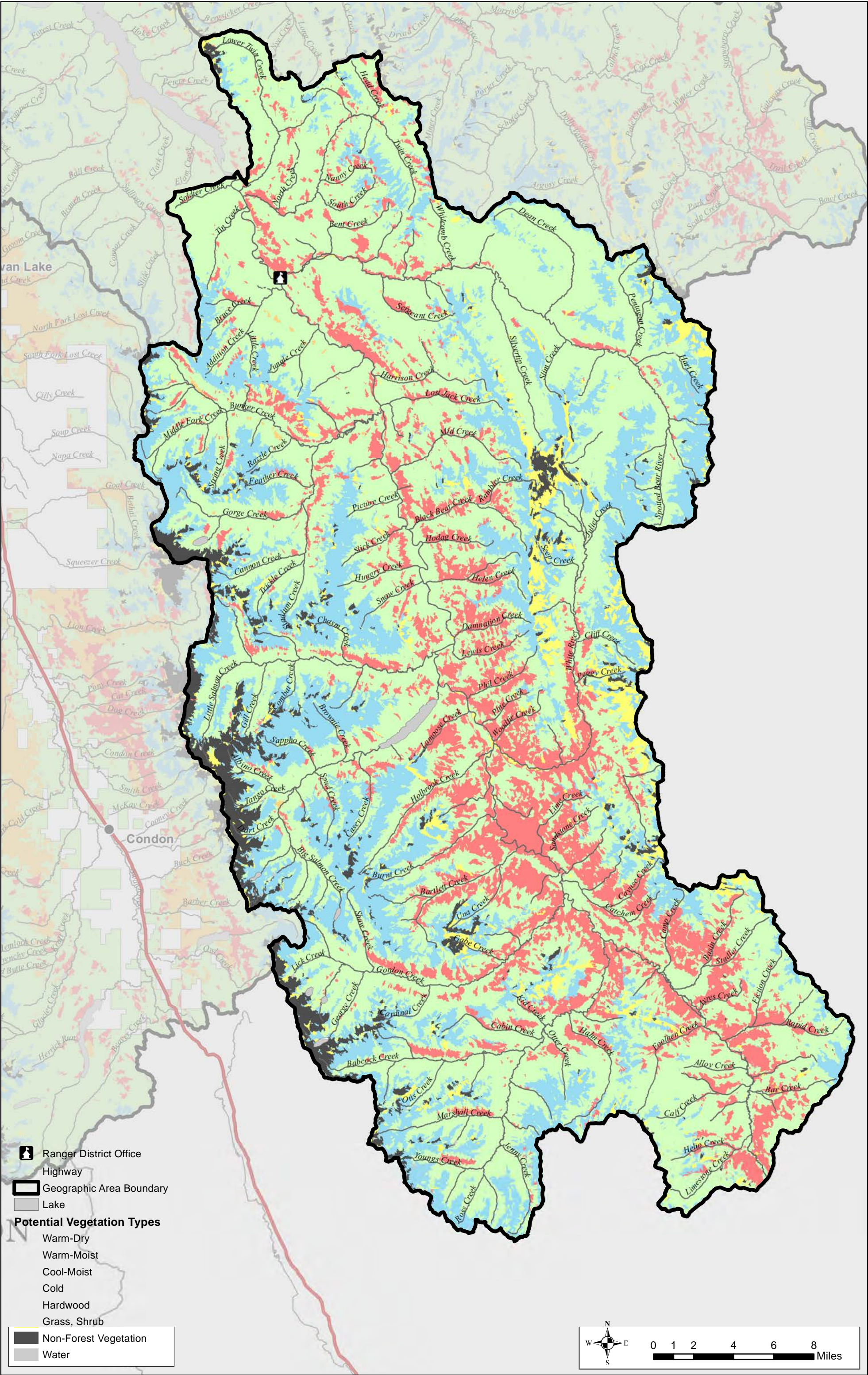


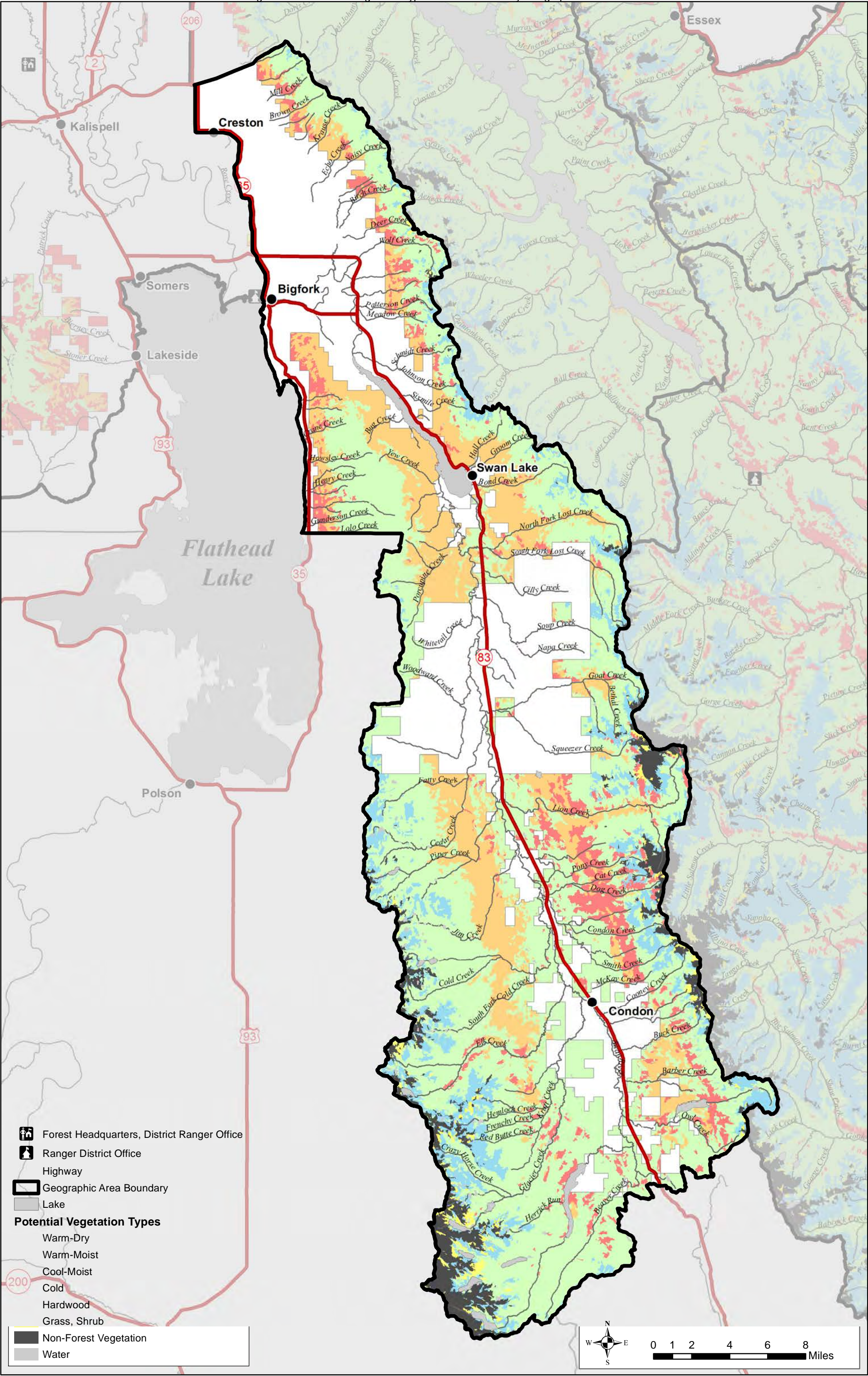


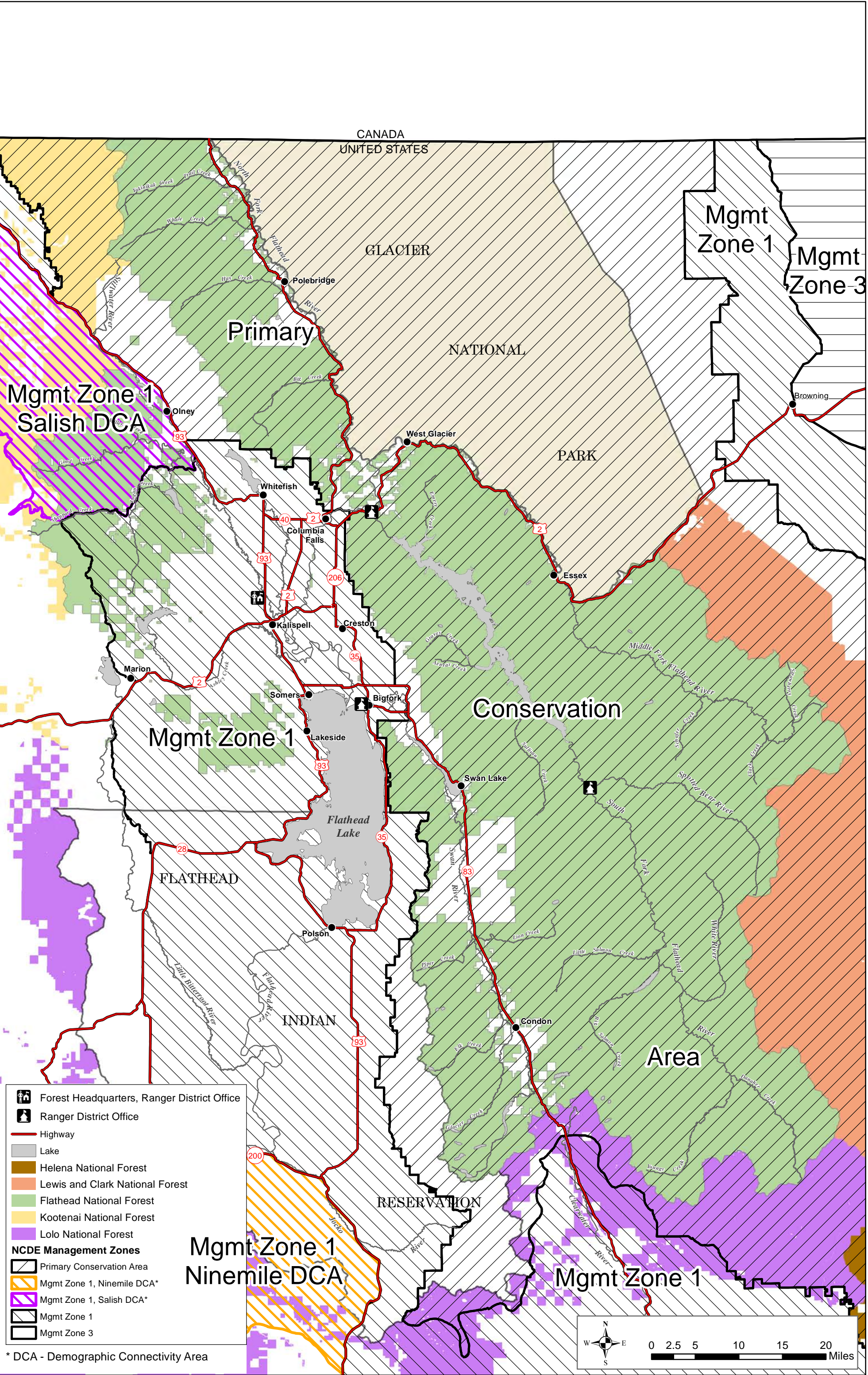


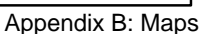




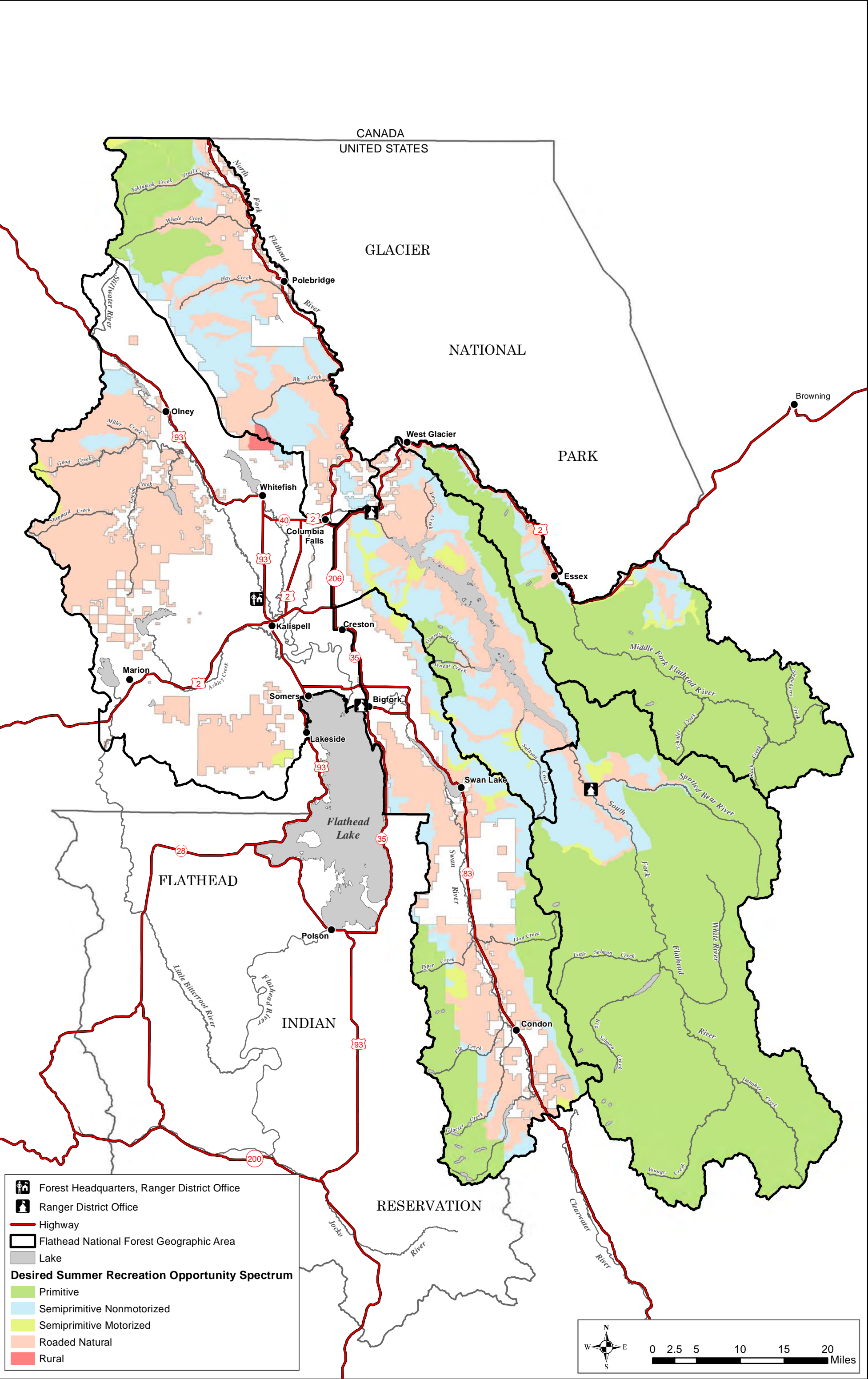


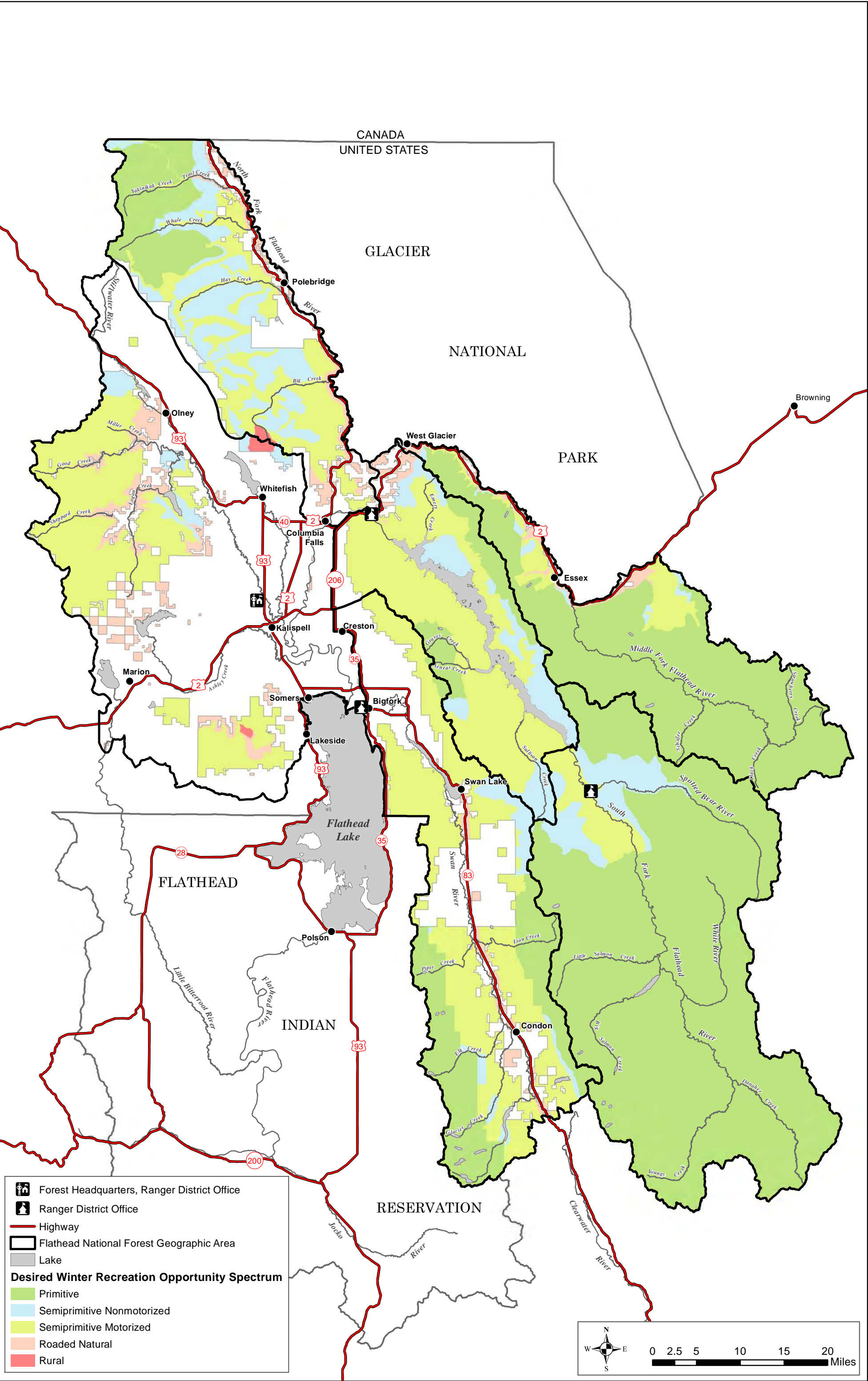


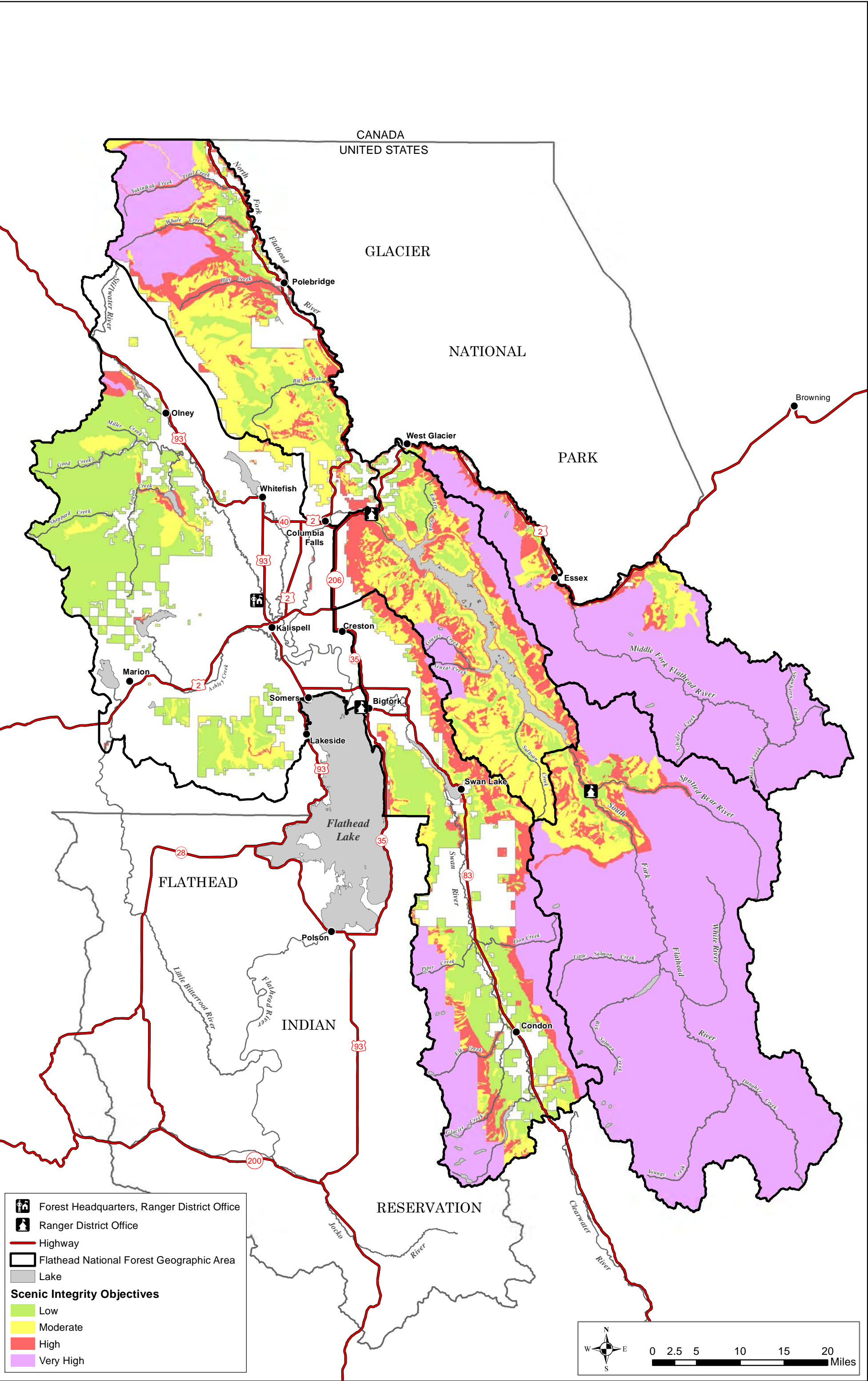




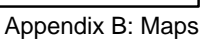


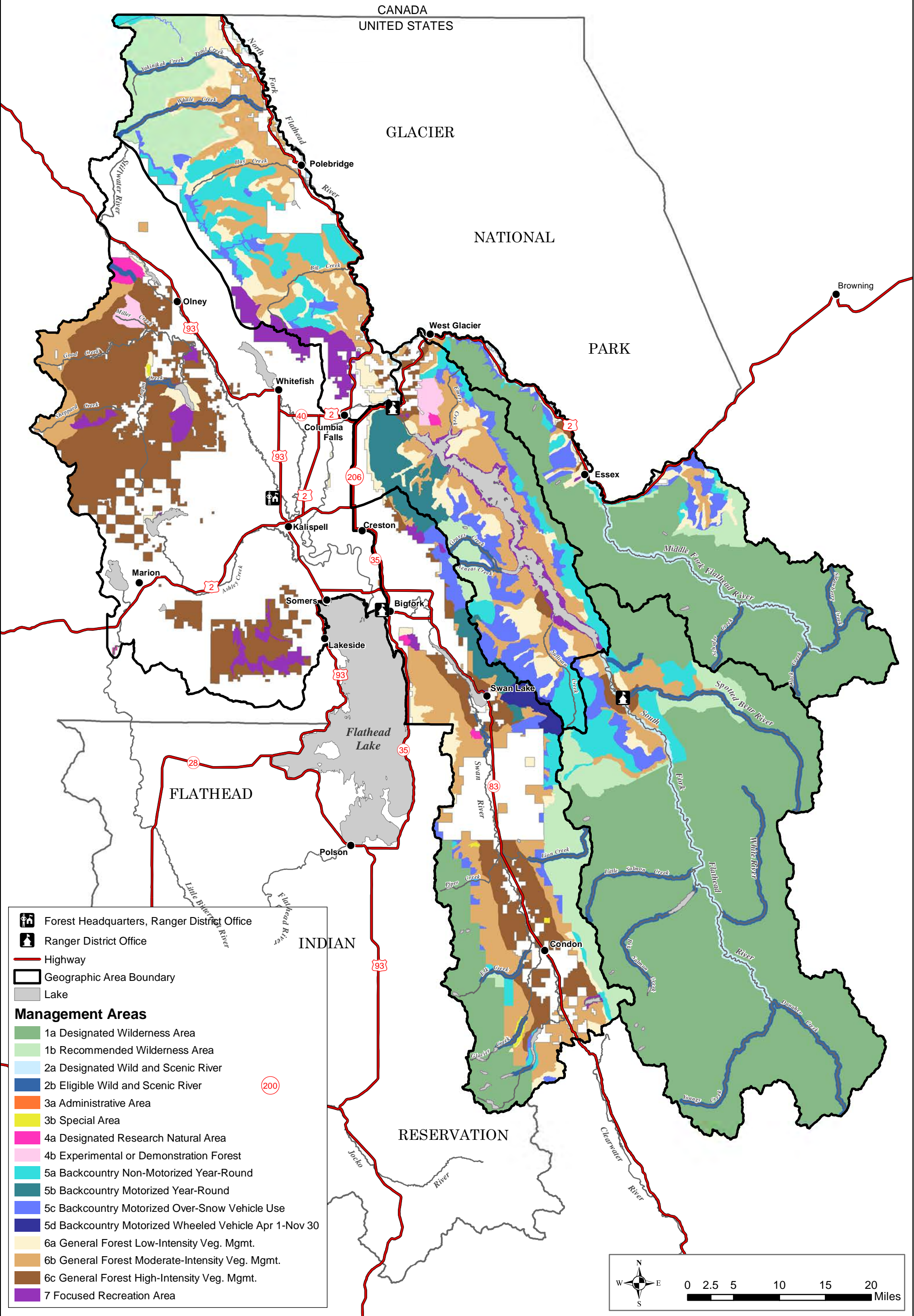


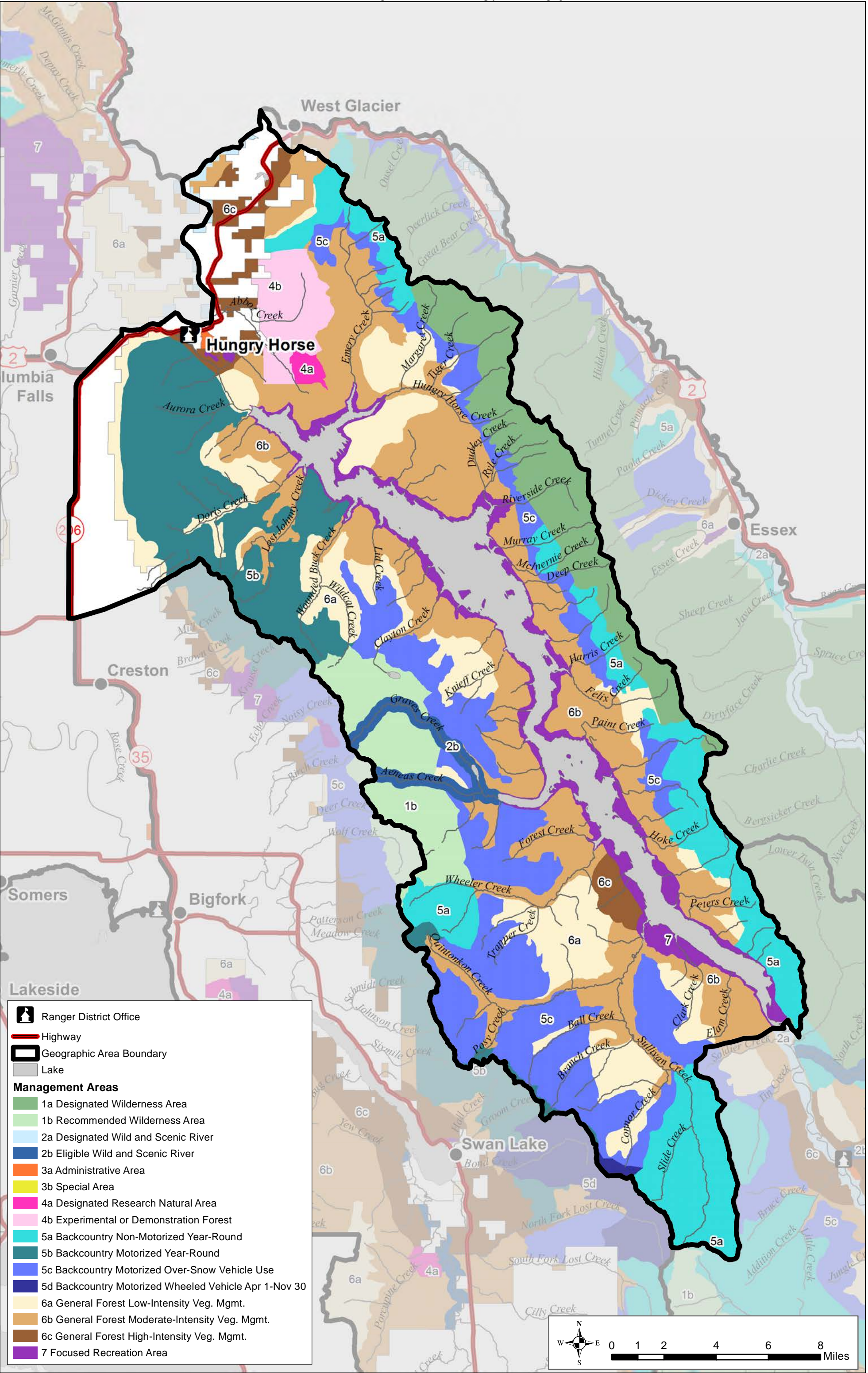


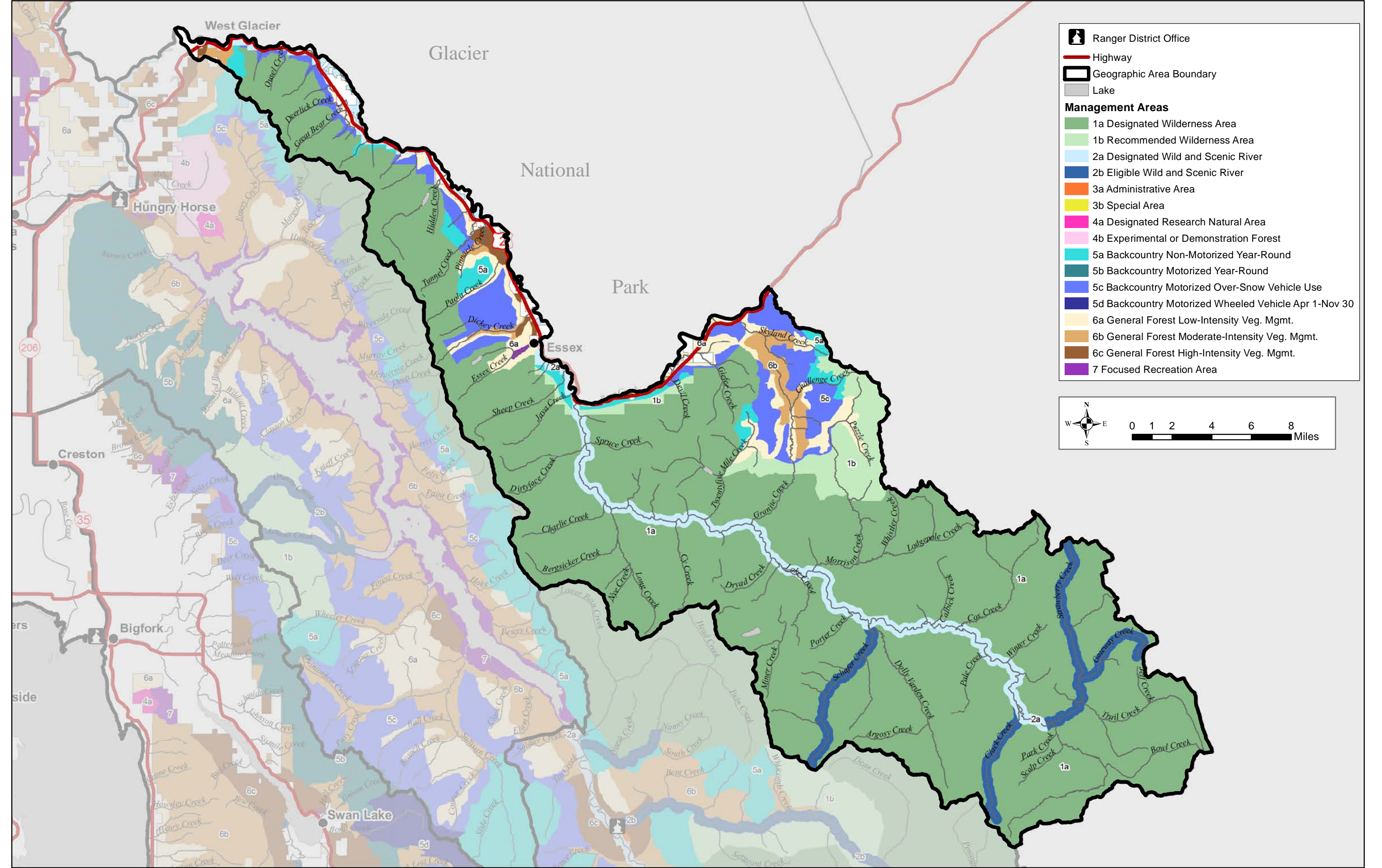


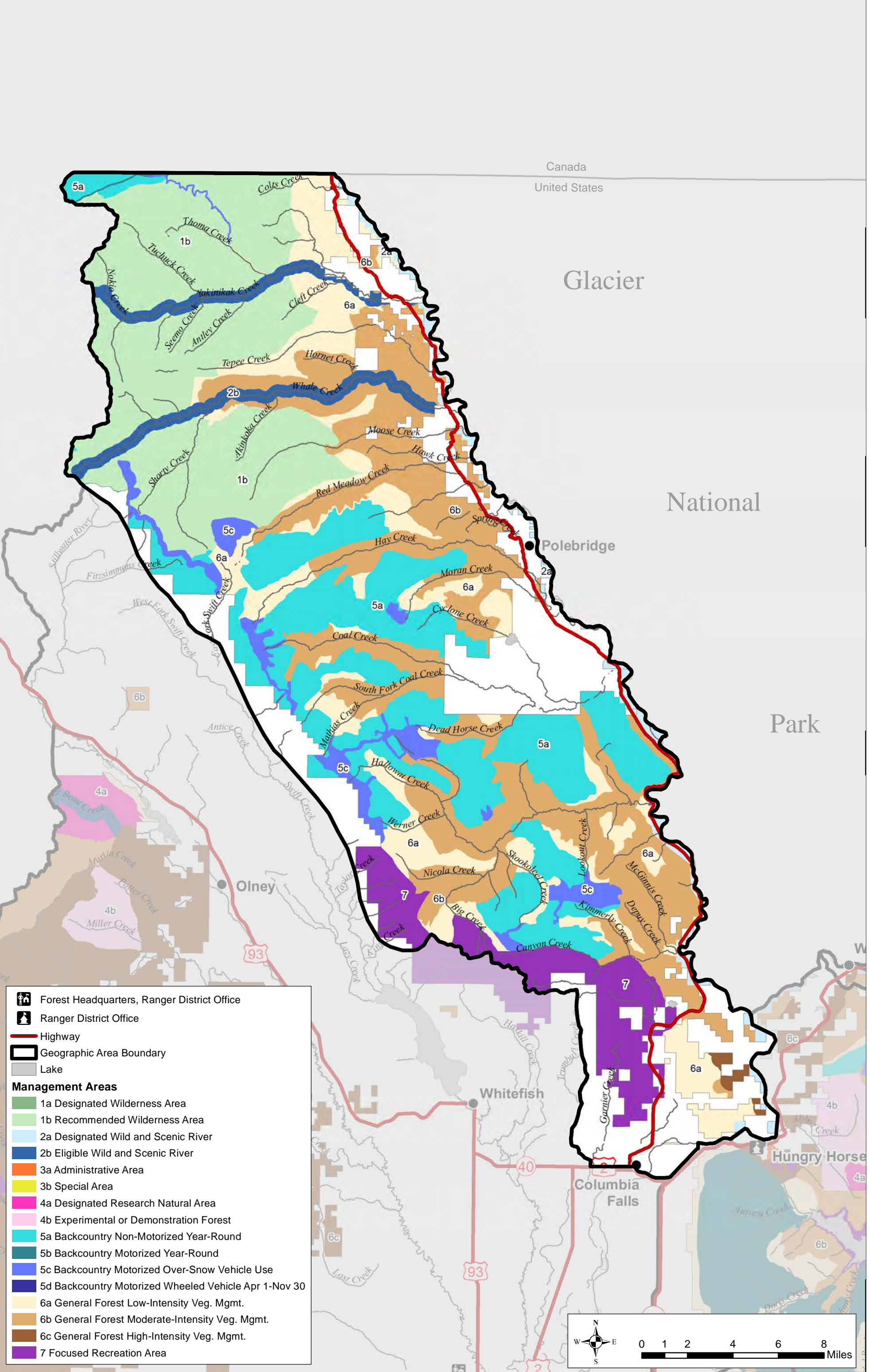


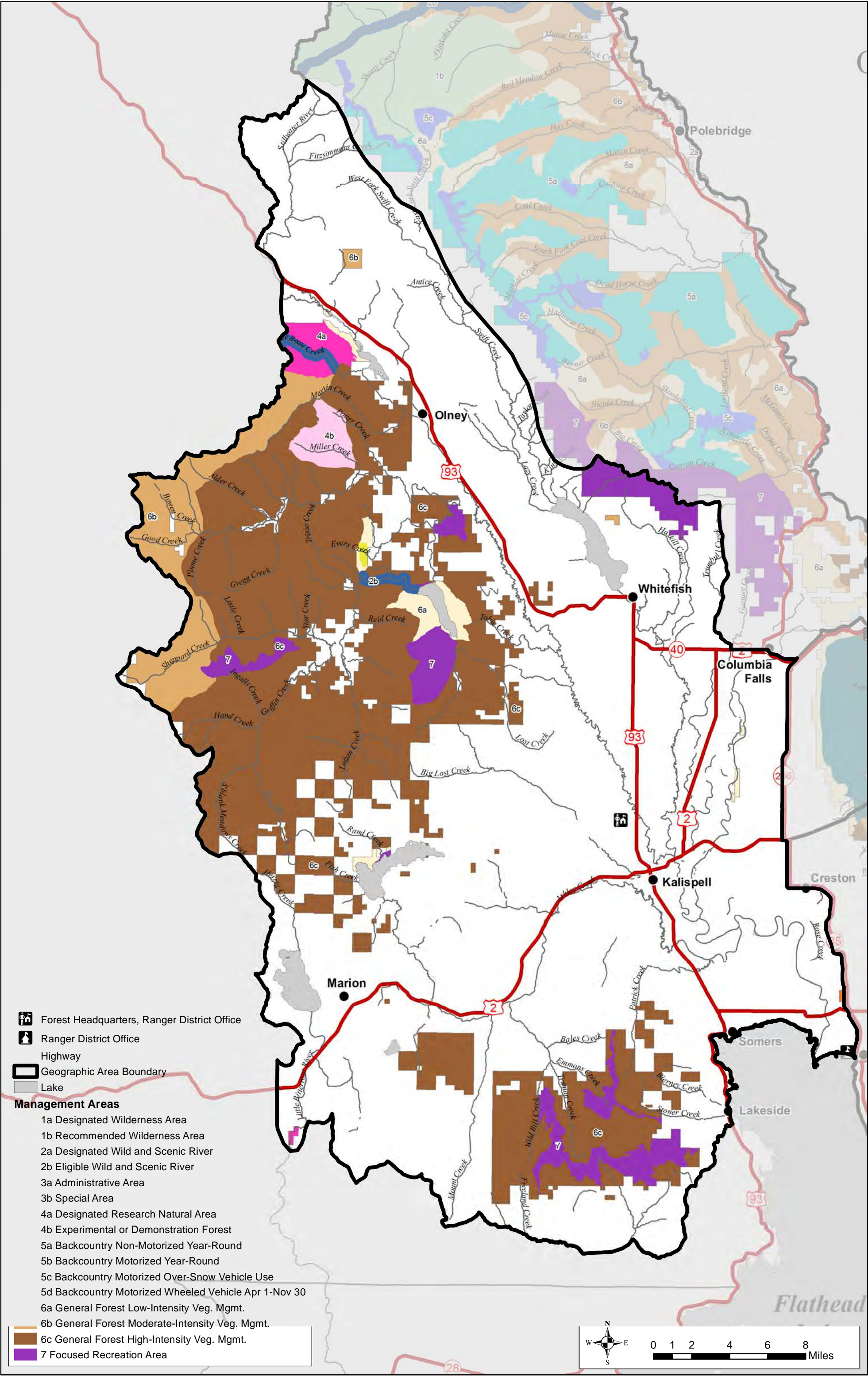


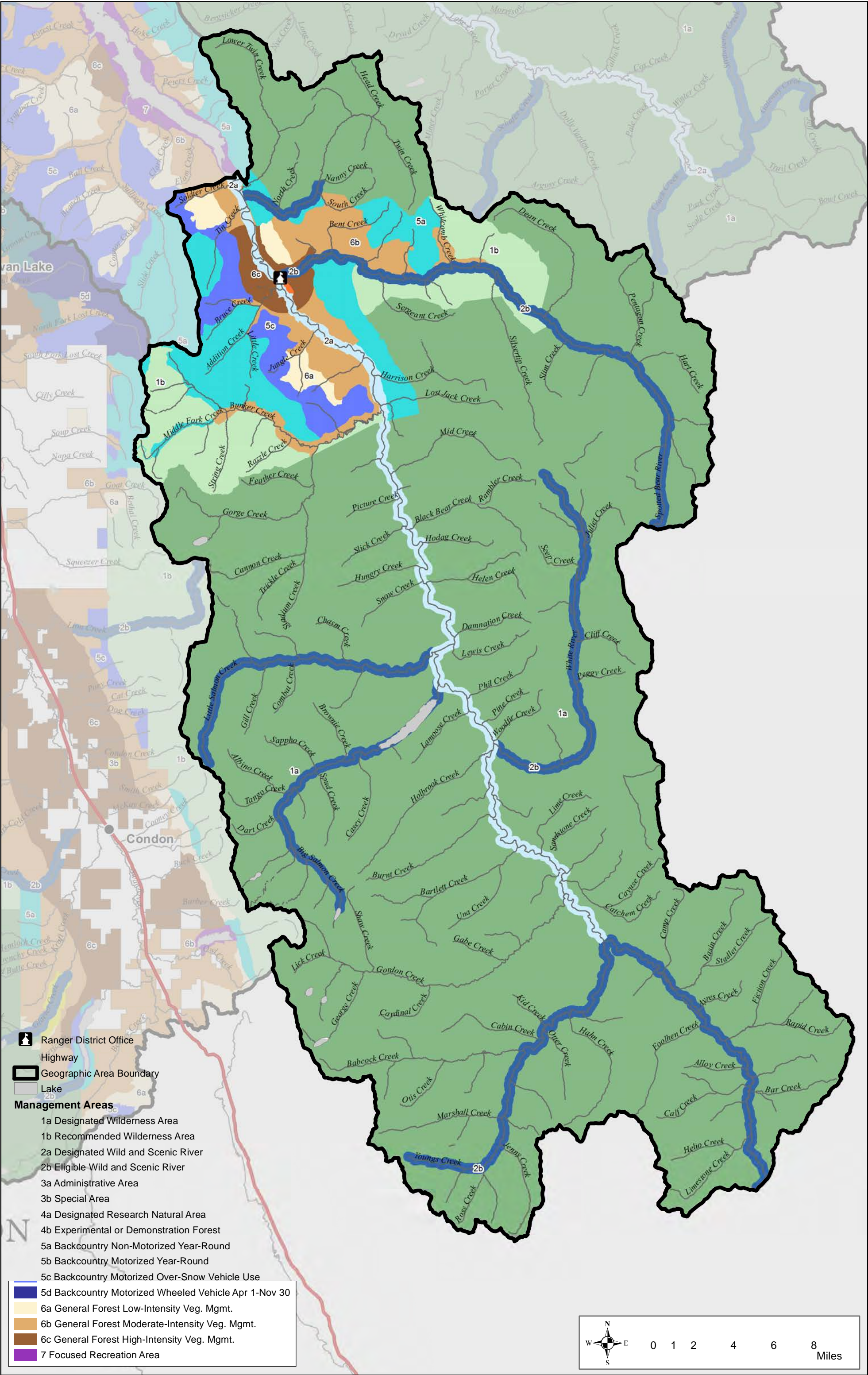


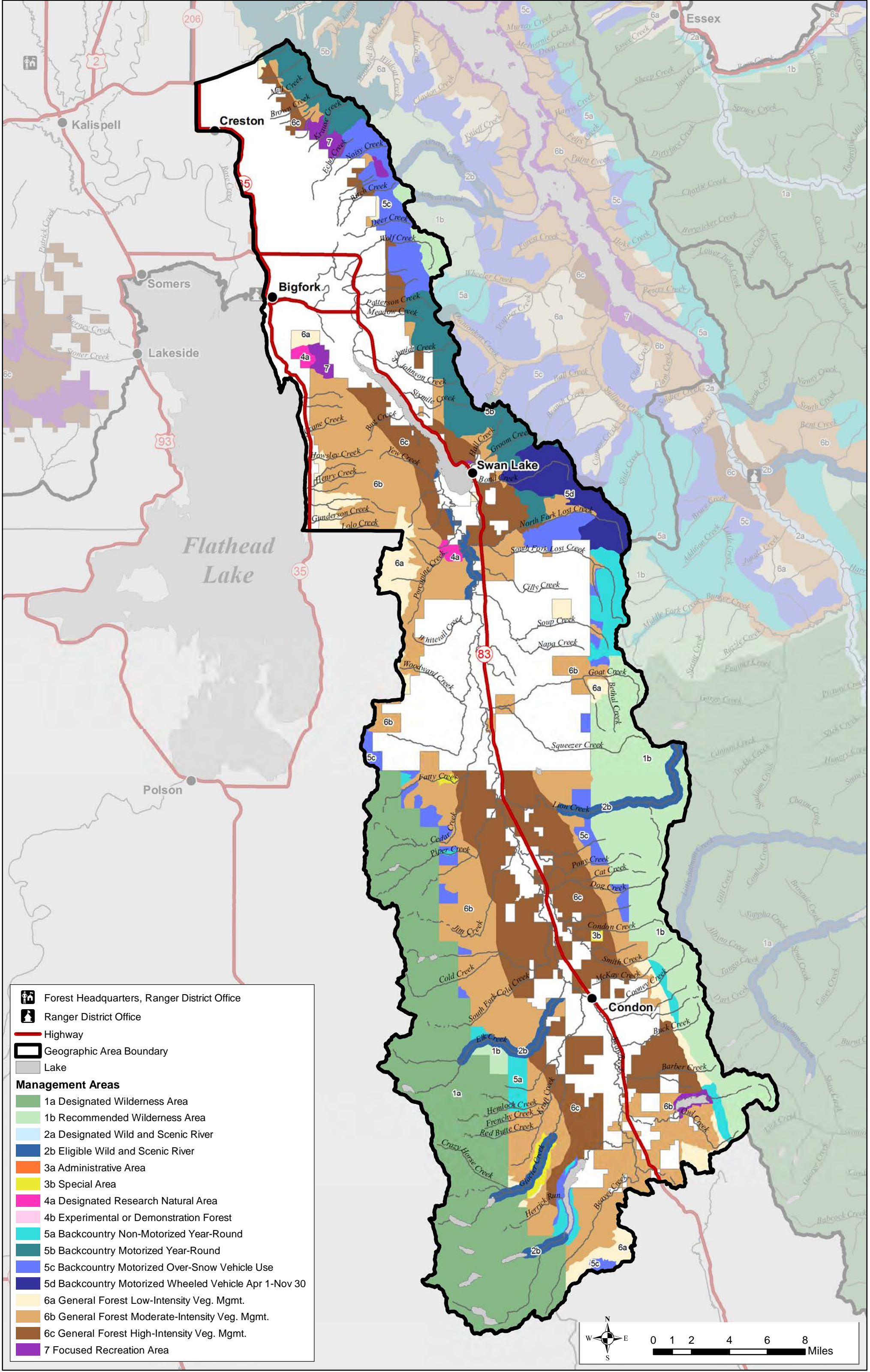


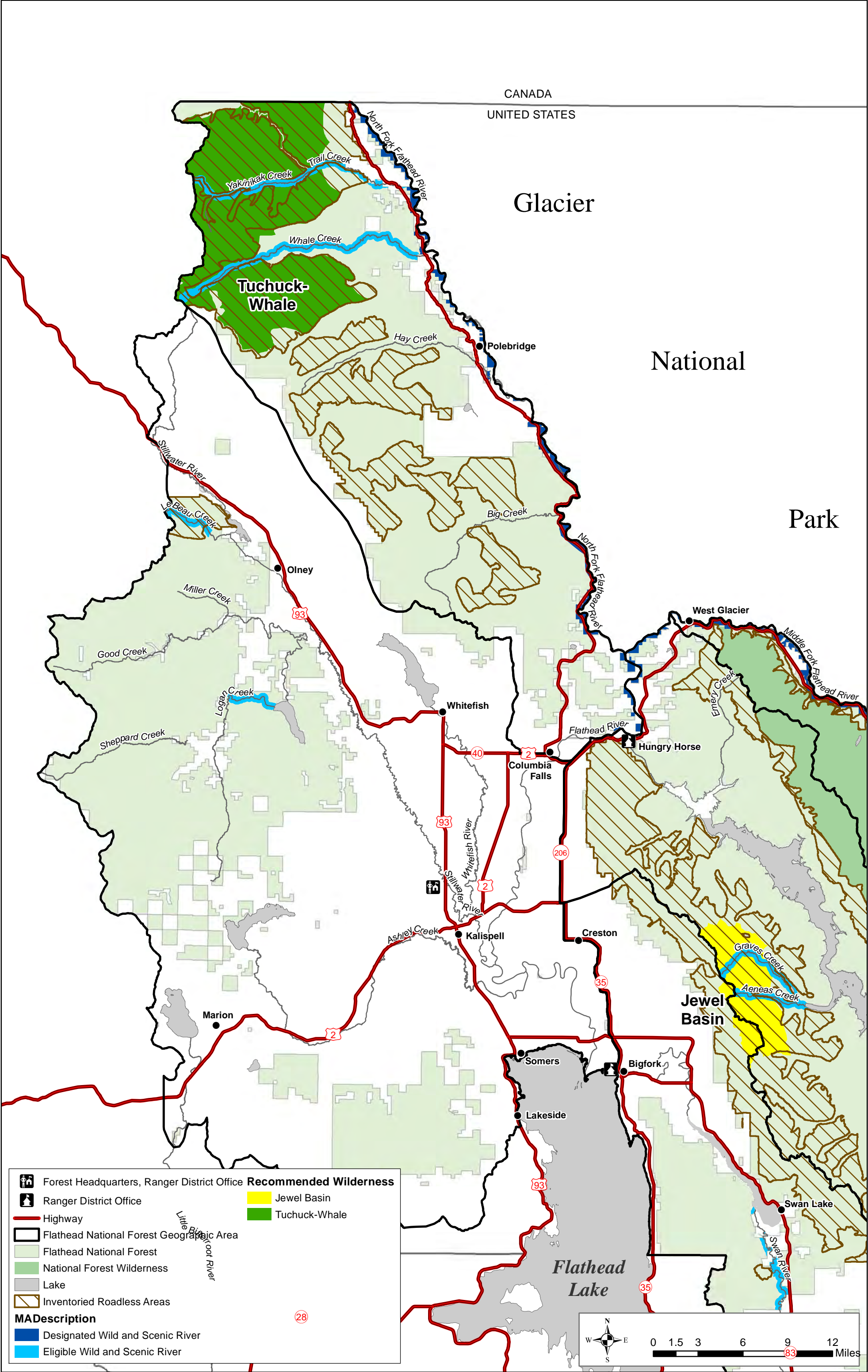


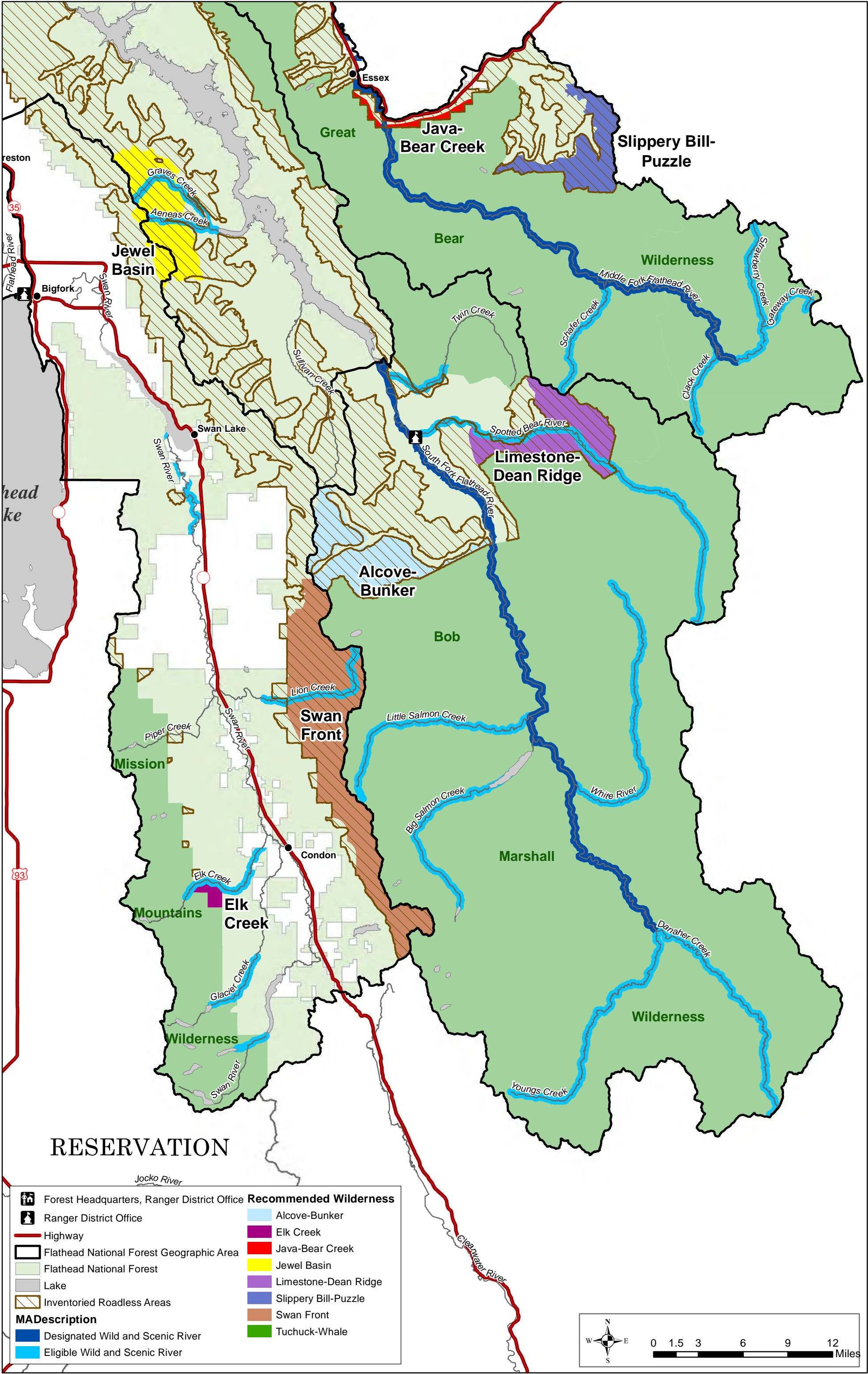


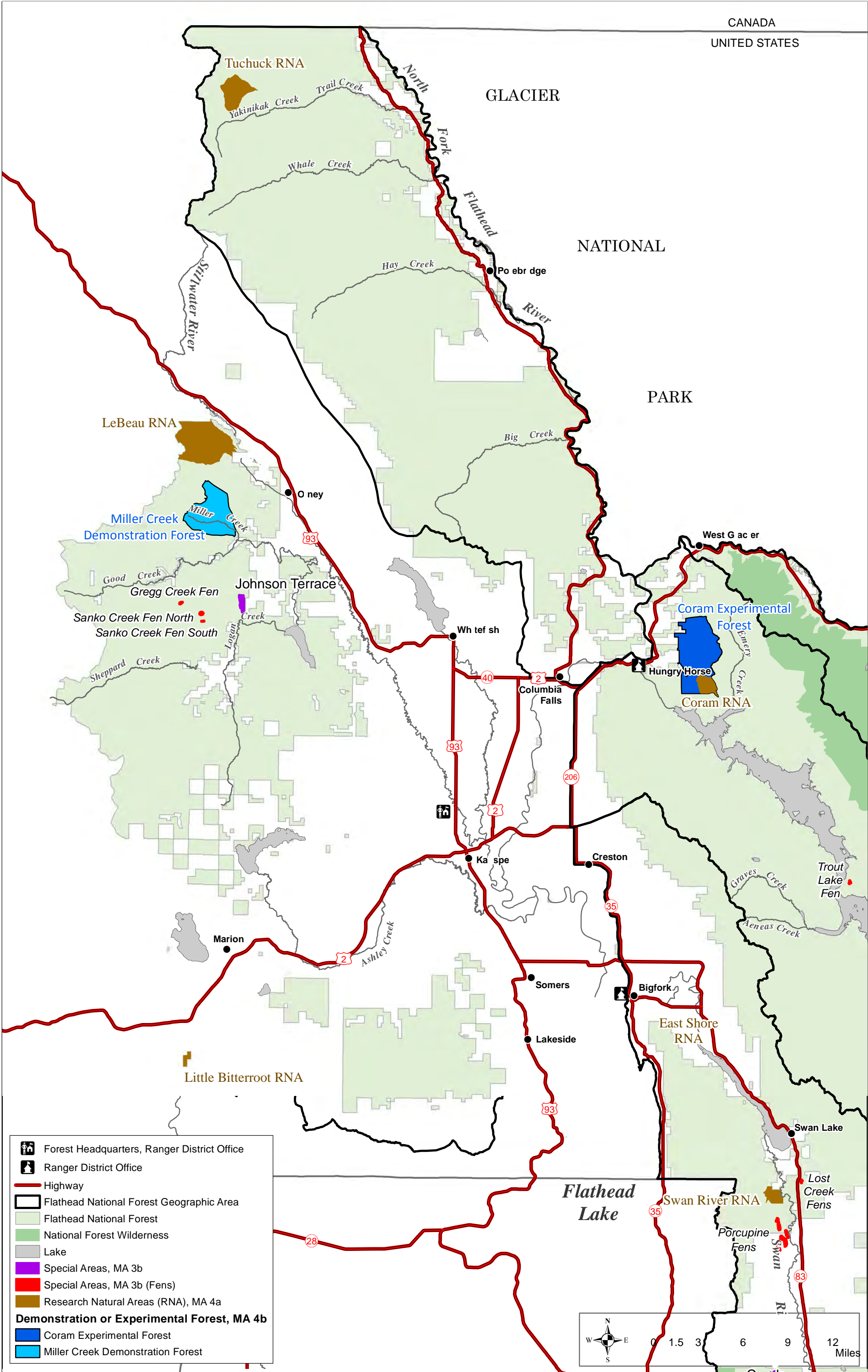


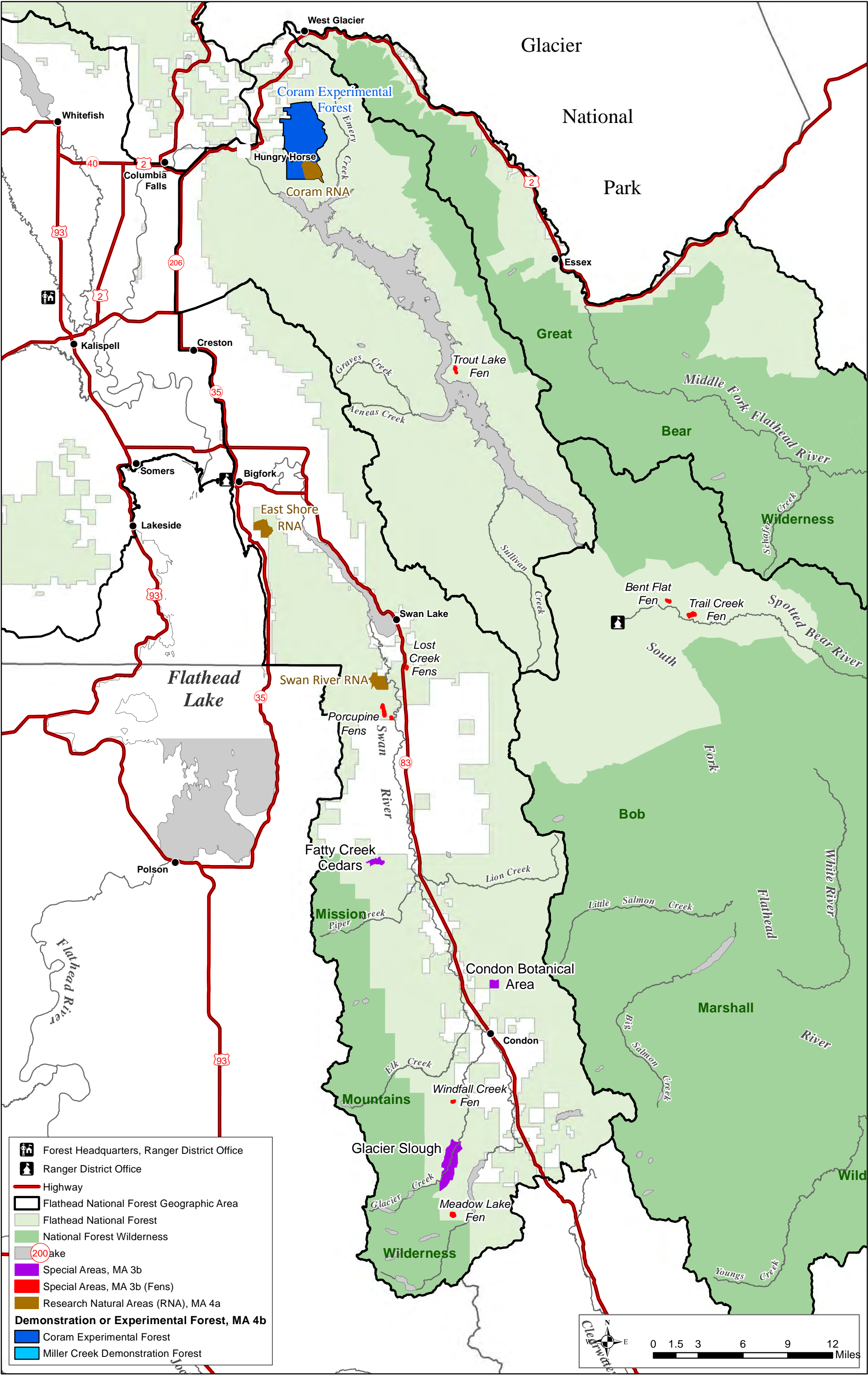


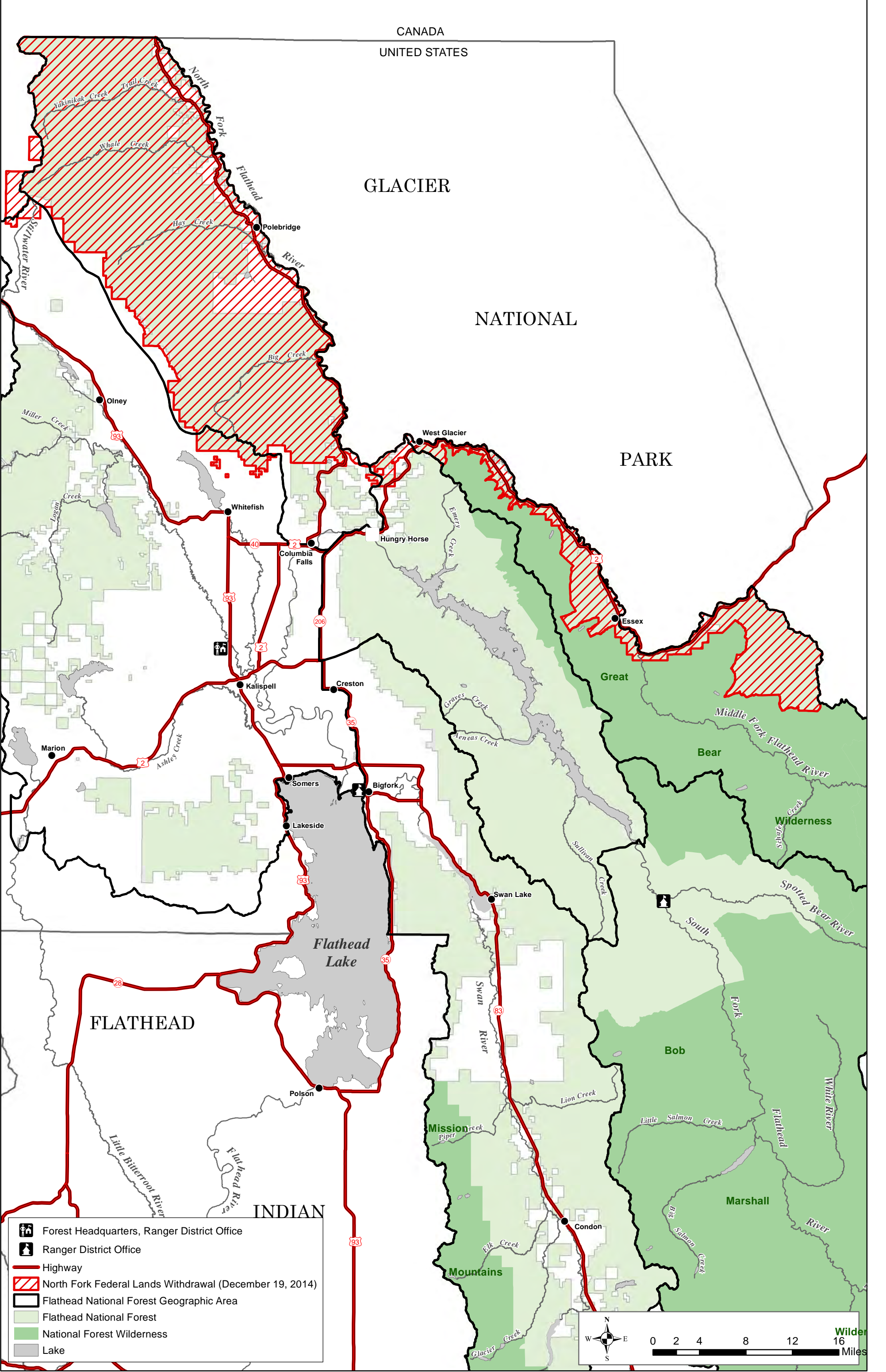


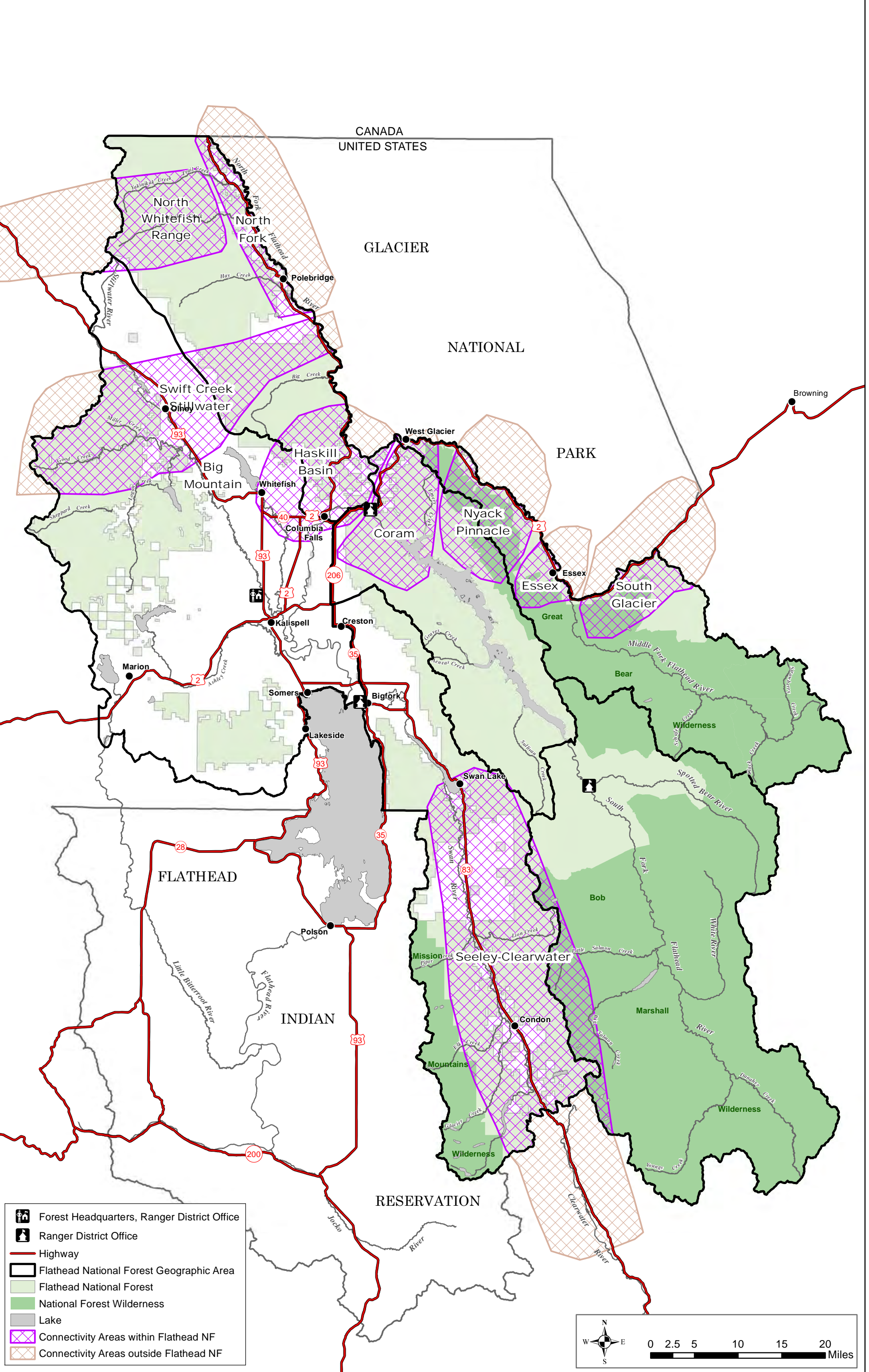


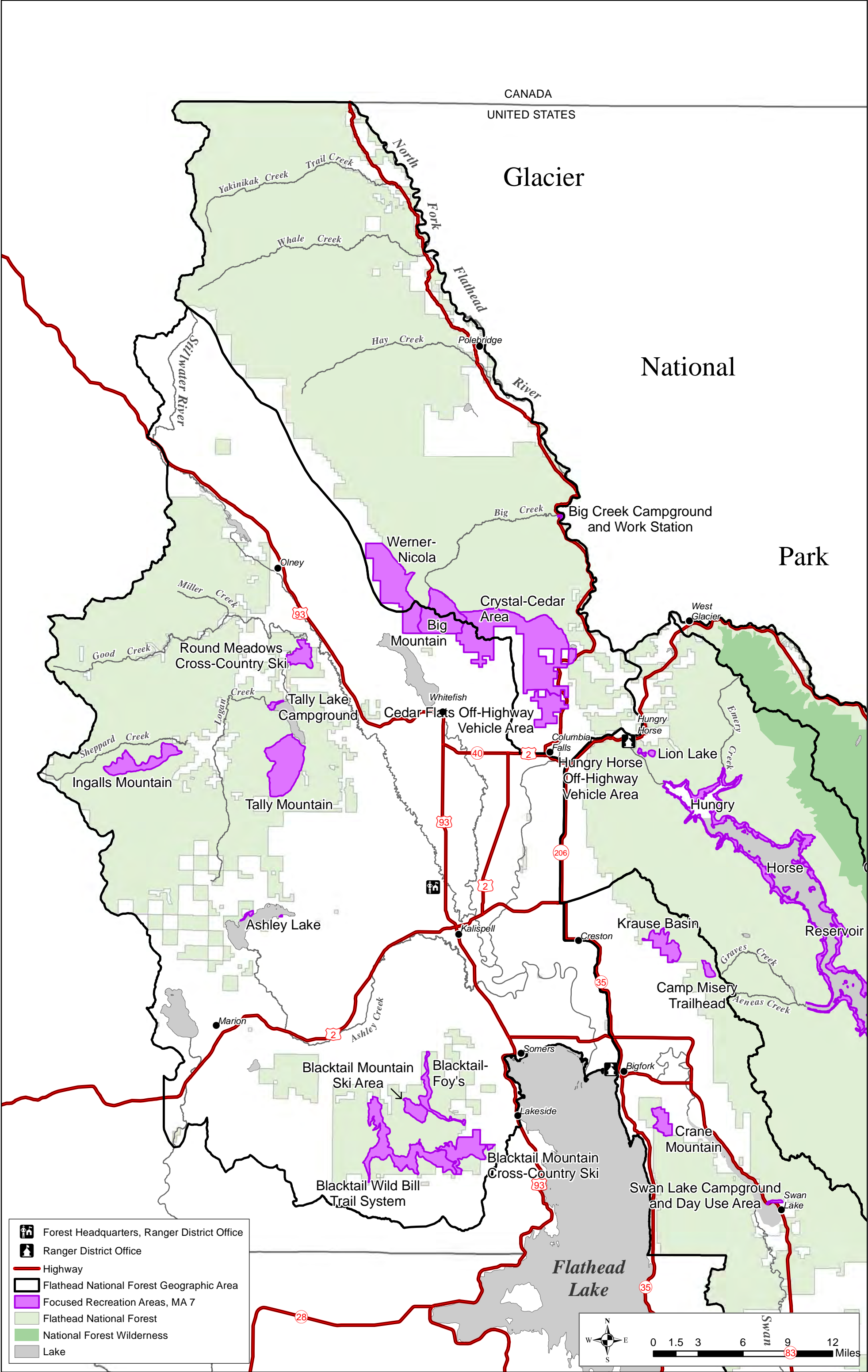


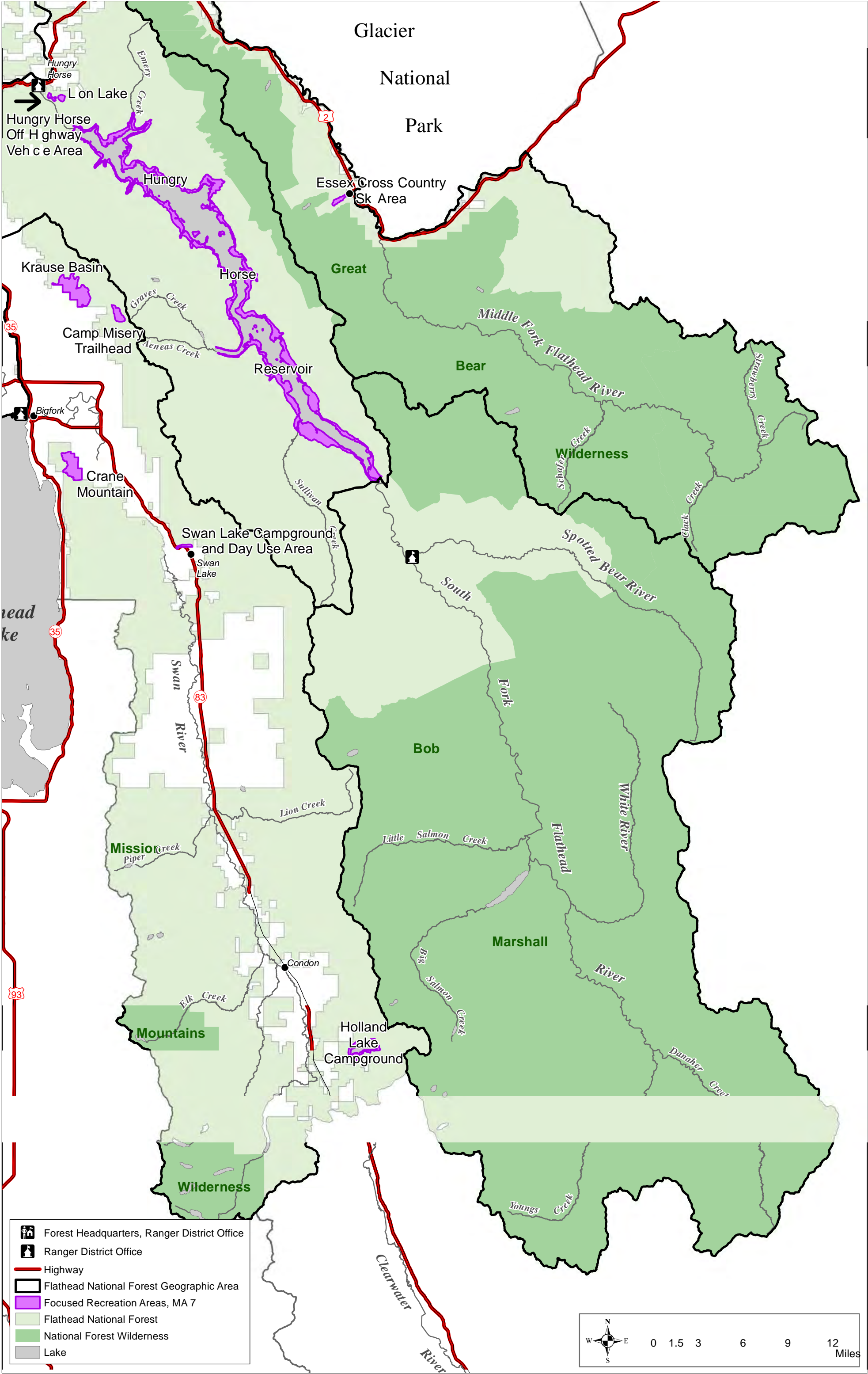


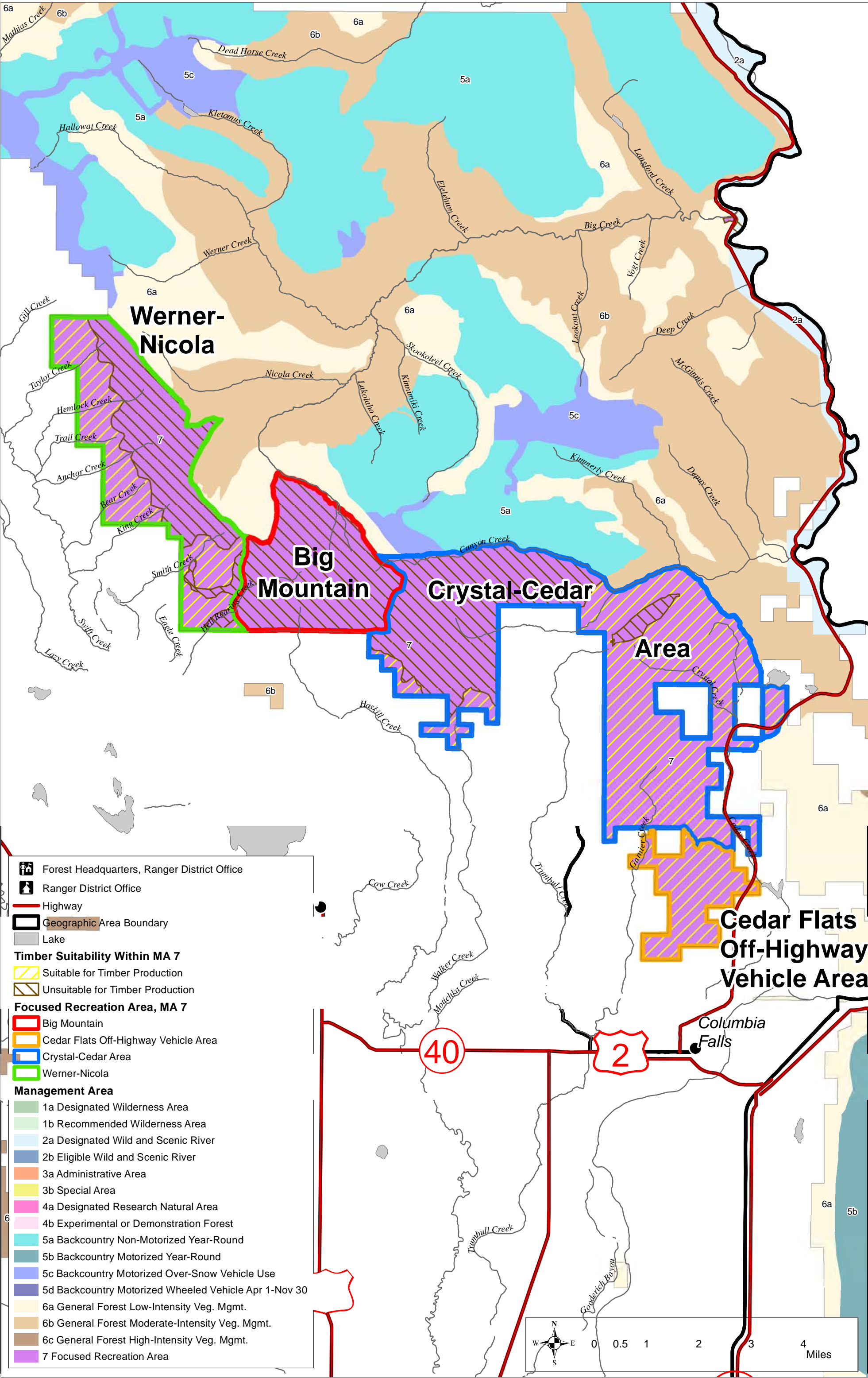












Appendix C: Potential Management Approaches and Possible Actions

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Introduction

This appendix describes some of the possible actions and potential management approaches and strategies the Flathead National Forest might undertake to maintain or make progress towards achieving the desired conditions described in the forest plan. It is also intended to help clarify how the planned outcomes (i.e., objectives, desired conditions) in the plan might be achieved. The potential management approaches included here may be used to inform future proposed and possible actions. It does not serve as a “to do list” of projects; it does not suggest expected locations or dates of implementation; and it is not an all-inclusive list.

This appendix provides information by individual resource areas that is intended to clarify the intent and provide suggested means to achieve specific forest plan direction and components related to each resource area. Management approaches and strategies presented in this section may include suggestions for on-the-ground implementation, analysis, assessment, inventory or monitoring, as well as partnership and coordination opportunities the Forest is suggesting might be helpful in achieving its desired conditions. The potential approaches and strategies are not intended to be all-inclusive, nor are they commitments to perform particular actions. The types of actions that are exemplified in this appendix do not commit the Flathead National Forest to perform or permit these actions but are provided as actions that would likely be consistent with plan components and that might be undertaken to maintain or move towards the desired conditions and objectives. Although the purpose and need developed for a specific project may address one or more desired conditions identified in the forest plan, each individual desired condition would not need to be met on every project nor in every treatment area within a project.

The forest plan of the Flathead National Forest employs a strategy of adaptive management in its decisionmaking and achievement of the plan’s 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, then monitoring and evaluating results and adjusting future actions on the basis of what has been learned. This is a reasonable and proactive approach to decisionmaking considering the degree of uncertainty in future ecological, social, and economic factors.

Other than the following section, which is a required element of forest plans developed under the 2012 planning rule, this appendix describing potential management approaches and possible actions is optional content in the Flathead National Forest plan. Forest plans may include optional content such as potential management approaches, strategies and partnership opportunities, or coordination activities (36 CFR § 219.7(f)(2)).

Possible Forest Management Actions and Timber Harvest Levels

The 2012 planning rule requires land management plans to

contain information reflecting proposed and possible actions that may occur on the plan 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 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’s 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)).

This section meets the above requirement of the 2012 planning rule by identifying 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 one to two decades but does not include speculation about the specific amount, frequency, location, magnitude, or number of actions during the plan period. This identification of possible actions is limited to timber harvest treatments. Other kinds of forest management actions would also be expected to occur across the Forest, such as precommercial thinning and prescribed fire. Other treatments and management approaches to achieve desired conditions for vegetation are discussed in the section of this appendix titled Terrestrial Vegetation and Vegetation Treatments.

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 SPECTRUM model. The expected timber product outputs for the first decade of the planning period are included as objectives FW-OBJ-TIMB-01 and FW-OBJ-TIMB-02 under the Forest Vegetation Products: Timber section of the forest plan, and in table c-2. Possible actions included in this section of the appendix are related to the possible timber sale program, timber-harvesting levels, and the proportion of probable methods of forest vegetation management practices expected to be used over the life of the plan. However, speculation about the specific amount or type of treatments, frequency, location, magnitude, or numbers of actions during the plan period is not included. These details related to management actions would be determined at the project level based on site-specific conditions.

The SPECTRUM 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 pathways.

Table C-1 displays the acres and probable treatments expected for the first and second decades of the plan period. Production of sawtimber and other wood products is expected through commercial timber harvest activities, which includes even-aged regeneration harvests (e.g., clearcut, seedtree, shelterwood) and other non-regeneration harvests (for modeling purposes, these are mostly commercial thinning, with lesser amounts of group selection harvests). The appropriate or optimum methods of harvest would be based upon site-specific determinations, as evaluated and determined during project planning and documented in a silvicultural prescription.

Table C-1. Vegetation management practices for timber harvest with annual average acres for the first and second decades of the plan period

Type and Decade of Harvest	Acres
Even-Aged Regeneration (decade 1)	2,138
Even-Aged Regeneration (decade 2)	2,045
Nonregeneration (decade 1)	1,000
Nonregeneration (decade 2)	1,000
Total (decade 1)	3,138
Total (decade 2)	3,045

Table C-2 displays the projected timber sale quantity (for products meeting utilization standards) and the projected wood sale quantity (for products meeting utilization standards plus those that do not meet

utilization standards, such as fuelwood or biomass). Timber harvest on lands both suitable and unsuitable for timber production would contribute to the projected timber sale quantity and projected wood sale quantity, as displayed in table c-2.

As required by the 2012 planning rule, the estimates in table c-2 take into account the fiscal capability of the planning unit and are consistent with all plan components. They are based on the Flathead National Forest's average budget levels for fiscal year 2012 through fiscal year 2014. However, the estimates of 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. Modeling of the projected timber sale quantity under an unlimited budget and consistent with all plan components resulted in an average annual volume output in the first decade of 38 million board feet (7.6 million cubic feet). The sustained yield limit is 25.4 million cubic feet per year, which is the maximum quantity of timber that may be sold on the Flathead, assuming that all lands (except those withdrawn for legal or technical limitations) were managed to produce timber without considering fiscal capability, resource requirements, or other multiple uses.

Table C-2. Projected timber sale program with annual average volume outputs for the first and second decades of the plan period

Category and Decade	mmcf	mmbf
Timber Products^a	5.3	26.3
A1. Lands suitable for timber production (decade 1)		
Timber Products^a	4.9	24.2
A1. Lands suitable for timber production (decade 2)		
Timber Products^a	0.2	1.0
A2. Lands not suitable for timber production (decade 1)		
Timber Products^a	0.6	3.2
A2. Lands not suitable for timber production (decade 2)		
Projected Timber Sale Quantity (A1 + A2) (decade 1)	5.5	27.3
Projected Timber Sale Quantity (A1 + A2) (decade 2)	5.5	27.4
Other Wood Products^b	0.8	n/ac
B. All lands (decade 1)		
Other Wood Products^b	0.8	n/ac
B. All lands (decade 2)		
Projected Wood Sale Quantity—Timber Products^a and Other Wood Products^b	6.3	n/ac
(A1 + A2 + B) (decade 1)		
Projected Wood Sale Quantity—Timber Products^a and Other Wood Products^b	6.3	n/ac
(A1 + A2 + B) (decade 2)		

a. Timber products = volumes other than salvage or sanitation volumes that meet timber product utilization standards.

b. Other wood products = fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3-7 inches).

c. n/a = not applicable

Source: SPECTRUM model analysis.

Possible Management Strategies and Approaches

Watersheds, Aquatic Habitats, and Aquatic Species

Watersheds, aquatic habitats, and aquatic species exist within a larger, interconnected hydrological system that often extends beyond forest management boundaries, such as Flathead Lake or the North Fork of the Flathead River.

The Flathead National Forest's plan components for aquatic ecosystem diversity and species diversity have a two-tiered approach. First, in the coarse-filter approach, aquatic ecosystems are managed towards reference conditions, which are approximated by conditions found in watersheds that have experienced minimal human disturbance. The assumption is that managing towards reference conditions would provide the majority of necessary habitat conditions to support the native aquatic species that have evolved locally. Due to societal and ecological changes, the Flathead National Forest cannot be managed to exactly mimic reference conditions, but managing aquatic ecosystems within this context would provide suitable aquatic habitats for native species. A primary mechanism of the coarse filter is the designation of riparian management zones. These are areas along streams, lakes, ponds, and other wetland areas that have specific protections in the form of standards and guidelines. Desired conditions for watersheds and riparian management zones are based upon the best available science. In addition, best management practices, including those described in Montana Forestry Best Management Practices (Ziesak, Sugden, Sims, Kolb, & Sanders, 2015) and National Best Management Practices (USDA, 2012), are implemented to protect or restore water quality under the Clean Water Act. These practices are also considered a key element of the coarse filter.

Second, species are evaluated to determine limiting habitats, population influences, and any special habitat needs that may not be provided through coarse-filter plan components. Fine-filter plan components are listed for species in one of the following categories: threatened and endangered species and species of conservation concern. Species may need additional species-specific plan components, such as those specified in conservation strategies for individual species or groups of species. For example, bull trout is currently listed as a threatened species under the Endangered Species Act. Through the plan components, including desired conditions, objectives, standards, and guidelines, this species would be anticipated to trend towards recovery and subsequent delisting.

Bull trout and bull trout critical habitat

The desired condition of working cooperatively towards recovery of the bull trout sets the stage for management.

FW-DC-P&C-16: The bull trout population trends towards recovery through cooperation and coordination with USFWS, tribes, State agencies, other Federal agencies, and interested groups. Recovery is supported through the Bull Trout Conservation Strategy and the Bull Trout Recovery Plan.

Direction within the Conservation Strategy for Bull Trout on USFS Lands in Western Montana (USDA-USFWS, 2013) would move the current baseline condition to an upward trend for each local bull trout population based on indicators (temperature, barriers, pools, and sediment). The strategy lists restoration activities such as barrier removal, road decommissioning, etc., for each local population. The Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) (also known as the Bull Trout Recovery Plan) (USFWS, 2015b) has 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. The Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*) (also known as the Recovery Unit Implementation Plan) (USFWS, 2015a) is a subset of the recovery plan that identifies threats and actions within each core area.

As an example of possible management actions, for the Flathead Lake core area, which the USFWS (U.S. Fish and Wildlife Service) defines as including the Middle Fork and North Fork of the Flathead River, the Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (USFWS, 2015a) proposes addressing habitat threats and water quality through the following actions:

1. Actions to Address Habitat Threats

1.1. Upland/Riparian Land Management

- 1.1.1. Conserve existing habitat and support passive restoration. Long-term habitat protection is in place for much of the Middle Fork and North Fork headwaters (Bob Marshall and Great Bear Wilderness and Glacier National Park), which comprise the largest interconnected network of cold water SR [spawning and rearing] habitat in the recovery unit. Passive restoration should continue in order to consolidate habitat gains in the managed portions (west side) of the North Fork and its British Columbia headwaters.

1.2. Instream Impacts

- 1.2.1. Improve productivity and stability of the Flathead Lake fish community by restoring habitat quality. Improve tributary passage and minimize nonnative species (i.e., brook trout) in potential tributary SR [spawning and rearing] habitat.
- 1.2.2. USBOR [U.S. Bureau of Reclamation] will follow VARQ (variable discharge) flood control procedures at Hungry Horse to balance refill with downstream flow. Maintain minimum flows all year for bull trout with a sliding scale based on the forecast. Operate to meet minimum flows of 3200 to 3500 cubic feet per second (cfs) at Columbia Falls on the main stem Flathead River and 400 to 900 cfs in the South Fork Flathead River (downstream of dam). Provide even or gradually-declining flows during summer months (minimize double peak). Limit outflow fluctuations by operating to ramping rates set in the 2000 Service [USFWS] Biological Opinion to avoid stranding bull trout.

1.3. Water Quality

- 1.3.1. USBOR will limit spill at Hungry Horse to maximum of 15 percent of outflow to avoid exceeding Montana State total dissolved gas standards of 110 percent.
- 1.3.2. Supply cold water. The primary prescription to address climate change in the Flathead Core Area is to continue to strengthen connectivity and consolidate habitat gains in headwater SR [spawning and rearing] tributaries while seeking to secure sources of cold water in the SR tributaries.

In this example, the Forest might address the threats to bull trout through the following possible management actions:

- continue restoration efforts in the North Fork of the Flathead River, such as road decommissioning and culvert upgrades,

- continue to provide cold water through riparian management and by hydrologically disconnecting road networks
- work cooperatively with other management agencies to address interactions of bull trout with non-native species such as lake trout and northern pike, not only in the Flathead core area but the Swan core area as well

Multiscale analysis

A multiscale analysis is an assessment that looks at aquatic species and habitat conditions at different scales and takes those conditions into consideration when making a management decision. The analysis considers conditions at the basin, subbasin, watershed, and reach scales, including habitat conditions from the PACFISH/INFISH biological opinion (PIBO) 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 (MFWP) and the USFWS. A multiscale analysis provides information useful for assessing project proposals within riparian management zones.

Watershed analysis, the precursor to multiscale analysis, is a widely applied methodology that was first required for use by the Forest Service in the USDA Forest Service Pacific Northwest Region (USDA, 1994). It was also described and recommended for use in interior Columbia Basin key and priority watersheds by the Pacific Fish (PACFISH) (USDA, 1995a) and Inland Fish (INFISH) strategies (USDA, 1995b). As originally envisioned and implemented, watershed analysis was a rigorous procedure developed to ensure that the emerging concept of ecosystem management was incorporated in agency planning and actions.

Although multiscale analysis is a logical continuation and refinement of watershed analysis, it is important to understand the differences between the two approaches. Watershed analysis placed a heavy emphasis on methodology and the collection and analysis of data from different disciplines for the purpose of understanding biological and physical processes and how they interacted in specific locations. It was expected to blend socioeconomic expectations with the biophysical capabilities of a particular watershed (USDA, 1994). Resulting analyses could be lengthy and highly detailed yet still not address integration. When watershed analysis was combined with riparian reserves (USDA Forest Service Pacific Northwest Region) or riparian habitat conservation areas (Intermountain and Northern Regions), these plan components proved successful in preventing actions that entered riparian reserves. Regarding the Pacific Northwest, Thomas and others noted that strategies in the NW Forest plan were not as successful in promoting active restoration and adaptive management or in implementing economic and social policies set out under the plan (Thomas, Franklin, Gordon, & Johnson, 2006).

Geographic data sets and analyses have dramatically progressed since those early efforts, providing much more analysis capability today. Multiscale analysis seeks to focus more on the integration of existing information and “provides a basis for integration and prioritization of conservation measures for wide-ranging species” (USDA-USDI-EPA-NMFS, 2013). Multiscale analysis does not require new data gathering or data generation. Rather, multiscale analysis uses available data summaries from relevant resources, sometimes at different scales, to consider multiple management objectives for the management area. The analysis considers existing conditions, factors limiting aquatic species populations, resource risks, restoration options, and available recovery planning information. Various scales of data help place management issues and opportunities into a meaningful context. The work mirrors the sensitivity and complexity of the issues being addressed.

Multiscale analysis was used to develop the Forest's conservation watershed network, starting with the scale of the Columbia River Basin. The best available science indicates the Flathead is important for conservation of native fish (bull trout and westslope cutthroat trout) across their range (Daniel J. Isaak, Young, Nagel, Horan, & Groce, 2015; Muhlfeld, McMahon, Boyer, & Gresswell, 2009; Shepard, May, & Urie, 2005; USFWS, 2015a). The Flathead River Basin is located along the spine of the continent and is predicted to provide cold water into the future due to the high elevation and slow climate velocities of mountain streams (D. J. Isaak et al., 2016). Next, the climate shield model (Daniel J. Isaak et al., 2015) and the temperature model (L. A. Jones, Muhlfeld, Marshall, McGlynn, & Kershner, 2014) across the Flathead River basin (6th hydrologic unit code) were used to determine where cold water is predicted to persist into the future in the face of climate change. The models both identified that cold water is predicted to persist in many of the Forest's watersheds containing local bull trout populations that had been previously identified as priority watersheds under INFISH (USDA, 1995b). Therefore, the Forest's priority bull trout watersheds and those watersheds designated as critical habitat by the USFWS (75 FR 63898) were carried over into the Forest's conservation watershed network.

The Forest also needed to take a closer scale look at its westslope cutthroat trout populations at the subbasin level (8th hydrologic unit code). There are many pure populations of westslope cutthroat trout on the Forest, unlike many other watersheds across their range where brook trout have either outcompeted them or rainbow trout have hybridized with them. The South Fork of the Flathead River subbasin is unique for its size in that there are no brook trout or rainbow trout populations above Hungry Horse Dam. The large patch size and the proximity and connectivity (10th and 12th field hydrologic unit code scale) of these populations make conservation important, as throughout the westslope cutthroat trout range only small fragmented populations exist (Rieman & McIntyre, 1995; Shepard et al., 2005).

Multiscale analysis could be used to determine the scope and need for management activities at the project level when vegetation management is proposed within riparian management zones. A multiscale analysis at the project level could assess habitat conditions and the extent and intensity of the proposed activities within the affected watershed. For example, if vegetation management activities are proposed within a hydrologic unit code 12 watershed, such as Wounded Buck Creek, four scales of analysis could be conducted: (1) habitat conditions (such as percent fines and other PIBO data) at the reach level; (2) bull trout status and habitat conditions in Wounded Buck Creek (hydrologic unit code 12); (3) bull trout status in the South Fork core area (hydrologic unit code 8); and (4) bull trout status in the Flathead Basin (hydrologic unit code 6). The project analysis would consider the project impact and status of bull trout in Wounded Buck Creek and the South Fork Flathead relative to the status of bull trout in the Flathead Basin.

Multiscale analysis could also be used to help demonstrate project-level consistency with a forest plan guideline, for example to show how specific treatment prescriptions within riparian management zones would meet the intent of the guideline. For example FW-GDL-RMZ-08 states: "If tree harvest activities occur within riparian management zones, live reserve trees should be retained (if present) to protect water quality and contribute to forest live tree structural diversity (and future dead standing and downed wood) for aquatic- and riparian-dependent species. Because site and forest conditions vary considerably, the sizes, species, density, and pattern of reserve trees would be determined at the project level." In this example, a multiscale analysis could provide information on how the site-specific live tree retention prescription for the proposed harvest areas meet desired water quality and forest structural diversity in the riparian management zones.

Lastly, the Forest identified two 12th field hydrologic unit codes in each 8th field hydrologic unit code where stormproofing would be targeted in the first decade of the plan. Reach scale data, barriers, and road

data were used to identify watersheds for restoration priority while integrating terrestrial restoration priorities for grizzly bear, for example.

Stormproofing priority conservation watershed networks

Major winter storms, particularly those in 2011 on the Forest and in adjacent Glacier National Park, have caused flooding that has damaged roads, campgrounds, and other infrastructure on the Forest. Road networks can impair water quality, aquatic habitats, and aquatic species in a number of ways, often to a greater degree than any other activities conducted in forested environments (Gucinski, Furniss, Ziemer, & Brookes, 2001; MacDonald & Stednick, 2003; USDA, 2001b). Roads intercept surface and subsurface flows, adding to the magnitude and flashiness of flood peaks and accelerating the recession of flows (J. A. Jones & Grant, 1996). Road networks can also lead to greater channel incision, increased sedimentation, reduced water quality, and increased stream habitat fragmentation.

Increased winter flooding is expected to occur on the Forest under warming climate conditions. In addition to more frequent flooding, larger fall rain events, and changes in timing and magnitude of runoff are all predicted to be influenced by climate change (Stewart, 2009; Wu et al., 2012). Therefore, the Forest has the opportunity to stormproof priority subwatersheds by adjusting the transportation network to be less exposed to anticipated changes.

Modern road location, design, construction, maintenance, and decommissioning practices can substantially reduce harmful interactions between roads and streams. Forest roads built decades ago were constructed with a focus on reducing construction cost. Maintenance budgets have not been able to meet road maintenance needs for decades. In addition, critical drainage components like culverts are nearing or have exceeded their life expectancies.

With regard to the aquatic environment, the forest plan addresses some of the expected effects of climate change using objectives that focus on stormproofing some of the most important subwatersheds for at-risk species such as bull trout (FW-OBJ-CWN-01 and 02). The focus area for this work is within the conservation watershed network, as identified in appendix E, with an emphasis on the high-priority subwatersheds of hydrologic unit code 12, shown in table c-3.

Table C-3. Conservation watershed network high-priority subwatersheds

Hydrologic unit code 12 (in numeric order)	Name
170102060311	Trail Creek
170102060404	Shorty Creek
170102060405	Upper Whale Creek
170102060406	Lower Whale Creek
170102070203	Granite Creek
170102070301	Bear Creek (Middle Fork of the Flathead River)
170102090601	Sullivan Creek
170102090702	Wounded Buck Creek
170102110206	Lion Creek
170102110303	Goat Creek

Stormproofing treatments focus on the infrastructure that will be retained. Examples of treatments include the following:

- Outslope roads.
- Add cross-drain dips and drainage dips at strategic locations.
- Remove overburden on pipes on stored road segments in locations at risk of failure.
- Store road segments and remove pipes at higher risk of failure.
- Re-align road segments off of floodplains and away from streamsides.
- Replace undersized culverts with larger structures, adding bridges if needed.
- Reroute road segments that chronically fail.

Riparian Management Zones

Management of riparian areas has multiple objectives, including providing clean water (minimizing nutrient and sediment inputs), aquatic habitat (with appropriate temperatures), habitat for riparian species, and connectivity across landscapes (Benda et al., 2004). Consideration of the scales of management and the potential effects of management is key to ensuring the maintenance of ecosystem resilience for riparian systems (Bisson, Gregory, Nickelson, & Hall, 2008). Proposed activities within riparian management zones should consider habitat conditions and the function and processes of riparian areas to provide shade and to minimize nutrients and sediments and potential adverse impacts to water quality. Further, the analysis considers the species that occur within the stream and the strength of that population.

FW-STD-RMZ-01 specifies the minimum total width of riparian management zones for the streams and mapped waterbodies (i.e., lakes, ponds, wetlands) on the Flathead National Forest. Minimum widths of the inner areas of riparian management zones are also described for the categories. In all cases, it is expected that total and inner riparian management zone widths would be confirmed during project analysis, guided by the unique site-specific conditions associated with the waterbody.

For category 3 streams where side slopes are greater than 35%, an exception is allowed to the minimum 100-foot inner riparian management zone in cases where a bench occurs. If the slope drops to 15% or less for at least a 30-foot distance, and the beginning of the bench is at least 50 feet from the ordinary high water mark of the stream, then the boundary of the inner riparian management zone may be placed at the toe of the bench. The remaining portion of the 100-foot riparian management zone would then be considered the outer riparian management zone. In all cases, the inner riparian management zone would be at least 50-feet wide on each side of the ordinary high water mark of the stream. This exception is consistent with the Montana streamside management zone law (MTDNRC, 2006), as illustrated in Figure C-1.

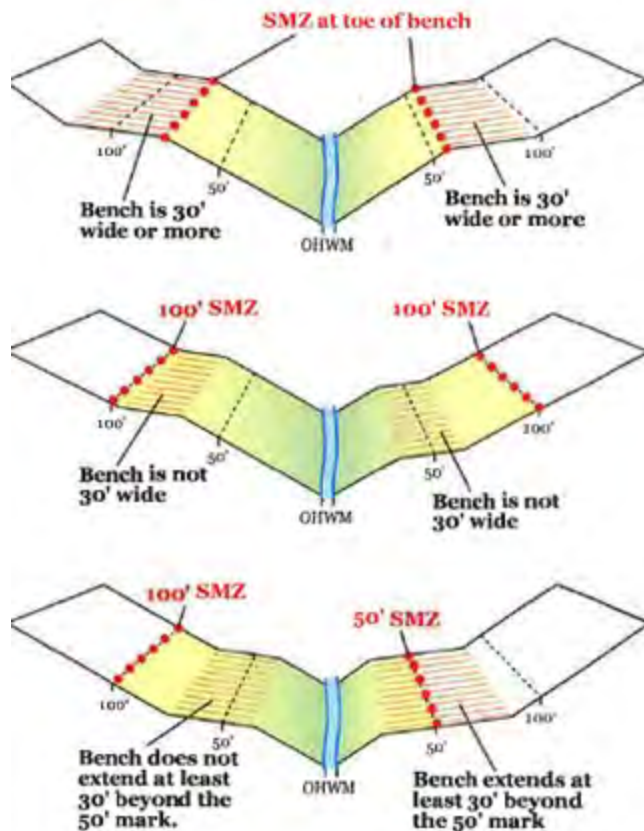


Figure C-1. Streamside management zone widths for benches measured from the ordinary high water mark (OHWM) of the stream (MTDNRC, 2006).

Available mapped riparian features and data layers

A forestwide stream and wetland data layer was developed for the forest plan, located in the forest plan GIS data library for future reference. These features were mapped using the National Hydrography Dataset (accessed in 2013), Montana Natural Resource Inventory Survey, Montana Natural Heritage Program data for fens, USFWS National Wetland Inventory database and maps, and local data sets produced by the Forest (including those with existing and potential sites for *Howellia aquatilis* and streams or rivers that have bull trout or westslope cutthroat trout). Based on this layer, the riparian management zones were mapped (using the ArcGIS buffer function), following the minimum width definitions for the entire riparian management zone (see FW-STD-RMZ-01). The riparian management zone GIS feature class is also located in the Forest's GIS data library.

For project-level analysis, the data layers described above may serve as a preliminary estimate of where water features and associated vegetation may be located and of the extent of the minimum width of the riparian management zones as defined in the plan. Actual locations and characteristics of streams and wetlands would be confirmed at the project level to facilitate site-specific analysis and application of forest plan management direction. As noted in riparian management zone standard FW-STD-RMZ-01, the total width and the width of the inner riparian management zone should also be confirmed at the project level of analysis, based on the unique conditions of the waterbody and the site.

Possible approaches and project-level considerations for vegetation management within riparian management zones

Riparian management zones are not suitable for timber production, but timber harvest is allowable where it would be consistent with desired conditions, standards, guidelines, management areas, and laws (e.g., Montana streamside management zone law). Preferred treatments would promote desired conditions that maintain or improve ecosystem integrity and promote resilience of the vegetation, water, fish, wildlife, and soils resources. In many areas, diverse structure in riparian management zones is promoted through natural ecosystem processes such as wildfire, insects, or disease. However, in other areas, particularly where fire and other natural processes are less likely to occur or be encouraged, vegetation management activities are expected to be used to meet desired conditions. These activities are expected to mostly occur within the outer riparian management zones, though some limited treatments would occur in the inner riparian management zone as long as activities are consistent with FW-STD-RMZ-06 (treatments must restore or enhance aquatic and riparian-associated resources, except for specific exceptions). Thus, riparian management zones are not “buffers” or “no management zones” since treatment may be necessary to achieve desired conditions. These treatments may be addressing not only stand-level conditions but also landscape-level desired conditions, such as by adding to a pattern of forest conditions/structures across the broader landscape that contributes to altering potential future fire behavior or increases the diversity of forest age classes, species compositions, and densities. Guidelines and standards are designed to protect values associated with the riparian management zone, such as limiting soil disturbance and retention of greater forest structural diversity. Instream habitat conditions will be monitored by the Pacific Anadromous Fish Strategy (PACFISH) and Inland Fish Strategy (INFISH) Biological Opinion Effectiveness Monitoring Program (referred to as PIBO) to ensure that desired aquatic conditions are achieved.

The following are examples of possible vegetation management approaches within riparian management zones:

- Apply precommercial or commercial thinning to increase the diameter growth of retained trees and/or the proportion of desired tree species for the purpose of developing larger trees of desired species. Treatments might achieve a number of desired conditions, including improved forest resilience to disturbances and climate change, facilitating development of future old growth and its connectivity, reducing fuels to alter potential fire behavior, or increasing the diversity of forest structural classes and wildlife habitat.
- Use group selection harvest or thinning to promote establishment and/or growth of desirable tree and plant species that are able to tolerate partially shaded growing conditions. Treatments might achieve desired conditions for increasing hardwood species or shrubs and promoting habitat for associated wildlife species, as well as retaining more cover and contributing to connectivity of habitat.
- Use fire (prescribed burning) at low to moderate severity to reduce forest density, increase forest structural diversity (e.g., snags and downed wood), and create conditions that favor development of understory shrubs, hardwood trees, and fire-tolerant conifer species (such as western larch).
- Use even-aged regeneration harvest methods of clearcut with reserves, seedtree cut with reserves, or shelterwood cut with reserves to meet guideline FW-GDL-RMZ-08 by retaining live trees within the harvest areas. Examples of even-aged and live tree reserve prescriptions include
 - ◆ creating more open conditions to favor regeneration and development of vigorous early successional plant communities, including grass, forb, shrub, and tree species such as aspen,

cottonwood, birch, western larch, ponderosa pine, and western white pine, while still retaining elements (such as snags or downed wood) that enhance forest structural diversity;

- ◆ leaving individual or patches of young, vigorous trees of desired species, such as 5-inch-d.b.h. or larger western larch or ponderosa pine, to contribute to short- and long-term structural diversity, long-term development of large and very large trees, and wildlife habitat connectivity and cover; or
- ◆ leaving individual or patches of large to very large diameter live trees that serve both to provide seeds for new regeneration, improve forest structural diversity in both the short and long term, improve resilience of stands to disturbance and other future uncertainties, and contribute to the very large live tree (and future snag) component now and in the future.

Guidelines FW-GDL-RMZ-12 and 15 require designing vegetation management activities within riparian management zones to avoid ground disturbance that would deliver sediment into water bodies or increase risk of alteration to hydrologic processes. The intent of the guidelines are to protect aquatic and riparian resources when conducting harvest operations. Since site-specific conditions can vary considerably, there may be a variety of implementation approaches and methods that would achieve the intent of this guideline. These would be determined through analysis and identification of mitigation measures during project-level analysis by an aquatic specialist. The following are possible approaches that may be applied:

- conducting ground-based logging operations during suitable winter logging periods;
- using full suspension yarding methods;
- using falling and yarding methods that minimize surface soil disturbance and retain understory vegetation and other groundcover (examples might be: use of slash mats, rubber-tired skidders on designated skid trails, a forwarder logging system); and
- using logging equipment located outside the riparian management zone, and reaching in, such as with a clipper or cable, to remove trees from the zone.

Habitat connectivity and possible approaches to harvest treatments in riparian management zones

Riparian management zones play an important role in providing for connectivity of wildlife habitat across the forest, which contributes to wildlife population resiliency and adaptability, particularly of species associated with interior forest conditions. Vegetation management, including timber harvesting, is allowed within riparian management zones and is expected to occur in some areas to meet desired conditions for vegetation and other resources. Retaining a sufficient amount and distribution of cover within riparian management zones along streams and between wetlands is a key element of the Forest's strategy of providing for connectivity of wildlife habitat across the landscape. This section discusses possible approaches for harvest treatments within riparian management zones that are consistent with desired conditions for habitat connectivity (desired conditions FW-DC-WTR-02 and FW-DC-RMZ-06; objective ALL 01 in forest plan appendix A: Northern Rockies Lynx Management Direction).

Several standards and guidelines provide direction specifically related to harvest activities within riparian management zones, including FW-STD-RMZ-01, 02, 05, 06 and FW-GDL-RMZ-08, 09, 10, 11, 12, 13, 14, and 15. These standards and guidelines would contribute to habitat connectivity and would be integrated and analyzed at the project level by the Forest wildlife biologist for determining appropriate site-specific prescriptions and treatments to achieve desired habitat connectivity.

Figure C-2 and figure c-3 and the discussion that follows provide possible approaches to harvest treatments within riparian management zones representing differing levels of contribution to desired

habitat connectivity. Site and project conditions would vary considerably across the Forest; these figures are a simplistic representation and comparison of only a couple of possible situations.

The examples in Figure C-2 portray a situation along a perennial stream. Connectivity along streams (longitudinal) as well as across streams (latitudinal) are both important considerations. In example A in Figure C-2, the unit configuration contributes at a relatively low degree to desired wildlife habitat connectivity at the site specific scale. This is because units are placed directly across the stream from each other, which reduces the latitudinal connectivity by necking down the width of the cover strip along the stream to 300 feet (the total width of the inner riparian management zone). Also, longitudinal connectivity is reduced because the opening within the riparian management zone extends over 1,000 feet along the stream. In comparison, examples B and C show examples of possible changes in unit configuration that would contribute to a greater degree to desired wildlife habitat connectivity, both longitudinal and latitudinal, within the riparian management zone. Other options to address connectivity could include modifying the prescriptions within the riparian management zone to provide cover and connectivity, such as by leaving residual patches of trees, shrubs, and downed woody material that would provide desired cover and connectivity.

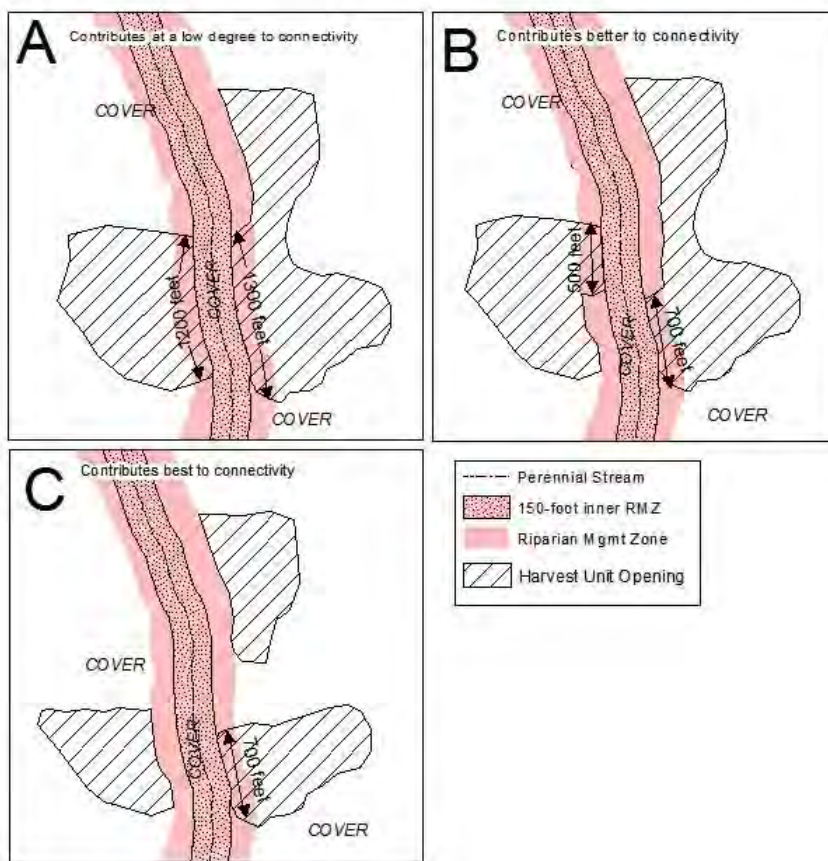


Figure C-2. Examples of even-aged regeneration harvest unit configurations within a riparian management zone for a perennial stream.

The examples in Figure C-3 portray a situation where harvesting is proposed within the 250-foot-wide outer riparian management zone areas associated with a wetland complex. Although example A retains

portions of the riparian management zones intact, it contributes at a relatively low degree to desired habitat connectivity between the wetland areas. Realignment of the unit boundaries in example B improves connectivity between the wetland habitats. An alternative approach to shifting unit boundaries might be to leave patches of trees, shrubs, and downed wood within the boundaries of the unit that provide cover or to alter the treatment prescriptions (for example, to a commercial thin) where sufficient trees and other vegetation remain to provide cover within the riparian management zone.

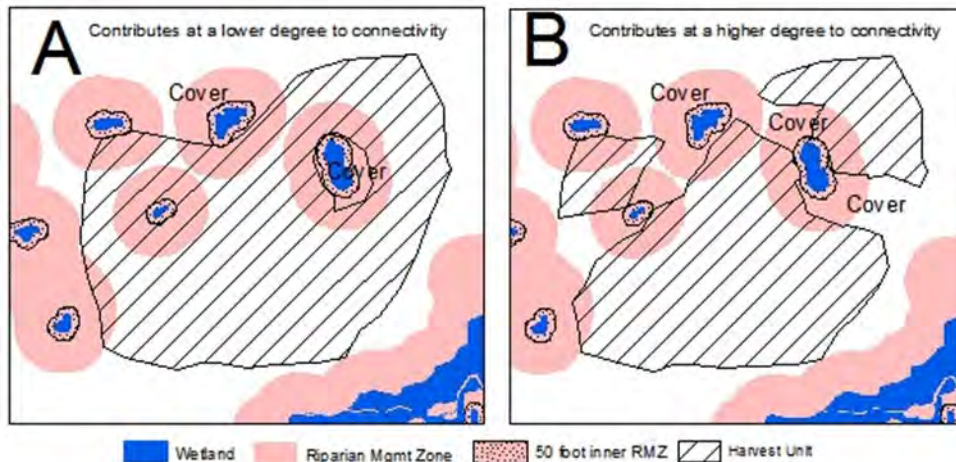


Figure C-3. Example of even-aged regeneration harvest units within riparian management zones for a wetland complex area.

Vegetation treatments in inner riparian management zones

Standard FW-STD-RMZ-06 is designed to provide increased protections to the portion of the riparian management zones that have the most influence on water quality and other aquatic elements as well as to riparian-associated plant communities and wildlife habitat. The standard limits vegetation management in the inner riparian management zone to activities that restore or enhance aquatic and riparian-associated resources. Exceptions are provided for nonmechanical treatments, for mechanical fuel reduction treatments in the wildland-urban interface within 300 feet of private property boundaries, and for certain situations that address human safety issues. Primary intentions of the standard are to avoid detrimental ground disturbance and maintain habitat diversity and connectivity. Examples of potential site-specific situations that might occur and possible approaches are as follows:

- Fuel-reduction treatment is needed within the inner riparian management zone for a category 1, 2, or 3 stream. Possible management approaches could include
 - ♦ thinning of understory trees, followed by hand piling of existing and activity-created downed woody material; and
 - ♦ reaching into the riparian management zone with a clipper or other mechanical equipment located outside the riparian management zone to pick up and remove smaller mid- and understory trees for piling outside the riparian management zone. This would also achieve the direction in guidelines FW-GDL-RMZ-12 and 15.
- A dense sapling forest needs to be thinned. A possible management approach could be
 - ♦ retaining the shorter understory shade-tolerant species and thinning the taller overstory sapling western larch, western white pine, or other desired species. This type of prescription could increase growth rates and potential for very large tree development by opening up the main canopy and could also retain sufficient understory trees to maintain and/or create desired forest

structure and habitat values within the riparian management zone, including multistory hare habitat (see also the section on Canada lynx later in this appendix). It could also promote the growth and development of the understory shrub/forb layer, as well as of hardwood trees such as aspen, birch, and cottonwood.

- Fire needs to be introduced to a riparian management zone in a natural manner (FW-GDL-RMZ-13). The purposes of this treatment might include fuel reduction within wildland-urban interface areas by reducing dead/downed wood and ladder fuels through the removal of a portion of the smaller-diameter understory trees; reducing stand densities to improve growth and vigor, favor fire-resistant species, and improve forest resilience; and promoting establishment and/or growth of hardwoods and shrubs or other ground vegetation to diversify vegetation composition and structure within riparian management zones and provide wildlife habitat for riparian-associated species; and diversify the forest structure within riparian management zones by creating snags and downed wood habitat. A possible management approach could be
 - ♦ igniting a prescribed fire outside the riparian management zone to allow it to back into the riparian management zone.

Key wildlife and plant species associated with aquatic and wetland habitats and riparian management zones

The following subsections describe potential management strategies and possible actions for plan components related to aquatic, wetland, and riparian plants and wildlife. These strategies and actions are intended to provide guidance for plan implementation; they represent possibilities, preferences, or opportunities rather than obligatory actions. Under an adaptive management approach, proposed strategies and actions are dynamic (changeable, augmentable, or replaceable) so as to be responsive to the results of new research, practical experience, and monitoring. Local inventories such as Greenlee (1999) and Cooper et al. (2000) may provide useful information on desired conditions.

Multiple wildlife species

Below are some examples of possible management approaches to address desired conditions FW-DC-RMZ-03 through 06. Site-specific conditions, locations, and project objectives would determine which wildlife species would be the focus of analysis of and provision for riparian management zone structure, composition, pattern, and connectivity. For example, the characteristics of cover (i.e., downed wood, trees or shrubs, height, density) and the connectivity pattern would vary depending upon the species and the unique situations within each project area. Possible strategies that promote desired conditions include the following:

- If harvesting timber adjacent to or within riparian management zones, design treatments to reduce the risk of excessive amounts of blowdown. One possible approach would be to vary the density and/or height of reserved trees within treatment areas, with higher densities immediately adjacent to the uncut forest and lower densities farther into the treatment opening, creating a “feathered” effect. This type of treatment might also reduce other edge effects that can be detrimental for some wildlife species.
- Create small openings in riparian management zones through harvest or prescribed fire to improve the diversity of vegetation structure and composition by increasing the amount and vigor of understory shrubs, forbs, and hardwood tree components.
- If openings are created in riparian management zones (either through natural processes or through vegetation management treatments), maintaining the cover of live trees and shrubs in adjacent areas

(if available) would promote connectivity until the cover of shrubs and trees is restored in these openings.

- Retain cover patches (if available) from riparian management zones to saddles between stream headwaters to provide animals desirable movement options from watershed to watershed.
- Except in post-fire situations where it may be desirable to remove some dead trees to meet desired conditions for other resources, leave all or a large number of dead trees, in a variety of sizes and including the largest trees available, in riparian management zones. Allowing these dead trees to remain would help meet wildlife habitat needs in these areas. Dead trees provide nest and den sites, perches, and day roost sites for bats. Downed wood and duff on the forest floor provides structure and habitat connectivity that benefit small mammals, reptiles, and amphibians. Some species feed on these downed dead trees or use them for cover from predators.

Black swift

Much of what is known about black swifts and potential threats to this species comes from limited science or science from other regions of North America. Possible strategies are identified below, but these may change as new information becomes available. Examples of possible strategies in support of FW-DC-WL DIV-01 and FW-GDL-WL DIV-05 include

- participating in cooperative efforts to survey waterfalls that provide known or potential breeding sites for black swifts to determine species presence and baseline habitat conditions, including shading and water flow throughout the nesting season;
- monitoring known nesting sites to identify any potential management concerns; or
- during the nesting season, timing activities that nesting swifts are not accustomed to so that they do not occur within 500 feet of active nesting colonies (e.g., rock climbing, concentrated recreation activities that involve prolonged stopping, helicopters, blasting).

Harlequin duck

Much of what is known about harlequin ducks and potential threats to this species comes from limited science or science from other regions of North America, such as Colorado. Possible strategies are identified, but these may change as new information becomes available. (For expanded details on these recommendations, see the work of Cassirer and Groves (1994), Wiggins (2005), or subsequent updates). Examples of possible strategies in support of FW-DC-WL DIV-01 and FW-GDL-WL DIV-05 are as follows:

- Participate in cooperative efforts to survey current nesting stream reaches, historic nesting stream reaches, and potential nesting stream reaches.
- Monitor the presence of harlequin duck pairs and broods during the nesting and brood-rearing seasons.
- If present, maintain dense vegetation and/or high densities of downed logs (including those burned by wildfire) adjacent to stream reaches with active or historic harlequin duck nesting sites to provide cover, protection from disturbance, and protection from predators.
- Manage watersheds with active nesting stream reaches to mitigate the risk of extreme increases in early-season streamflows (which might decrease reproductive success).

- Retain stream barriers (if present) between nesting stream reaches and downstream areas because they may help to reduce competition or protect nesting harlequins from predatory fish. In active nesting stream reaches, avoid transplanting predatory fish above natural stream barriers.
- Assess proposed mineral exploration or development in watersheds around nesting stream reaches for impacts to harlequin ducks and require provisions for harlequin ducks and their habitat needs in minerals management plans (for leasable, locatable, or salable minerals).
- Time temporary activities along active nesting stream reaches to avoid the time period when harlequins are present.
- Provide educational materials to the recreating public on how to avoid disturbing harlequin ducks.
- Evaluate existing roads and avoid construction of new roads, trails, or developed recreation sites along active nesting stream reaches.

Bald eagle

Examples of possible strategies in support of FW-DC-WL DIV-01 and FW-GDL-WL-DIV-02 and 05 are as follows:

- As bald eagles are known to use the same very large nest trees and alternate nest trees for very long periods of time, it is beneficial to retain these trees and protect them from wildfire, insects, and disease. Possible strategies are posting wildlife tree signs to alert people to their importance, using pheromones to repel insects, thinning, or prescribed burning around very large potential or active nest trees to reduce ladder fuels. Work around nests is best accomplished during the non-nesting season.
- Montana's Bald Eagle Management Plan (MBEWG, 2010) recommends maintaining visual screening between sources of human disturbance and known nests, roosts, and feeding areas where bald eagles concentrate unless topography, ecological characteristics, historical and proposed land use, human activity patterns, and the nesting pair's level of tolerance for disturbance indicate otherwise. Recommended management activities to provide visual buffer maintenance and enhancement include (1) managing forest and riparian habitats to protect and enhance important habitat components (e.g., perch trees and visual screening); (2) placing new construction (buildings, trails, boat launches/marinas, etc.) only in areas where visual buffers around nests can be retained; and (3) retaining a natural buffer around active nests, alternate nests, and large live trees and snags during fire protection activities that meet wildland-urban interface safety requirements and recommendations while also providing visual security for bald eagles.
- If a visual buffer is not present, then the following strategies for maintaining a distance buffer might be used (MBEWG, 2010):
 - ◆ Time potentially disturbing activities within 0.5 mile of active and alternate nests (for territories occupied within the last 5 years) to avoid the nesting time period specified in the guideline (although some activities may produce less disturbance and recommended distances might be decreased in areas where visual buffers obstruct the direct line of sight between activities and nests).
 - ◆ In addition, in areas where sources of disturbance predate eagle occupancy, where eagles have developed a tolerance for routine human activities, or where activities similar to the proposed activity already are occurring, reduce distance buffers, taking into account site-specific plans.

- ◆ During nesting season, maintain a distance of 0.25 mile or 1,000 feet above nests for helicopters and aircraft, except when necessary for biologists to conduct bald eagle nest surveys.
- ◆ Coordinate bald eagle nest surveys among agencies and companies to reduce duplicate surveying and also decrease additional disruption of nesting activities.
- In the absence of a visual buffer, recommended distance buffers for activities during the nesting season are as follows:
 - ◆ 0.5 mile for
 - construction of new marinas or boat launches with routine use by six or more boats;
 - any use of explosives or activities that produce extremely loud noise, such as blasting, use of jackhammers or gravel-crushing equipment, shooting ranges, or fireworks;
 - forest management activities that include harvesting and heavy truck traffic in areas that do not normally have that type of activity; and
 - construction of new, above-ground power and utility lines.
 - ◆ 0.25 mile for
 - any construction of infrastructure such as roads and trails or dozer lines for fire management activities, except when specifically constructed to save a bald eagle nest from fire;
 - forest management activities, including timber harvest layout, snag removal, prescribed fires, planting, and thinning; and
 - concentrated recreation activities, including hiking, fishing, hunting, camping, rafting, wildlife watching, biking, and motorized activities, including automobile use, off-road vehicle use, and boat or personal watercraft use that involves stopping (e.g., camping, anchoring fishing boats) or constant human use (e.g., popular hiking trails). Signage may be needed to encourage people to avoid stopping in the buffer area during the nesting season.

Great blue heron

Much of what is known about great blue herons and potential threats to this species comes from limited science or science from other regions of North America. Possible strategies in support of FW-DC-WL DIV-01 and FW-GDL-WL DIV-05 are listed below.

- Similar to bald eagles, develop and retain very large cottonwood trees near large rivers and lakes to benefit the great blue heron.
- During the nesting season, where cottonwood trees are actively used by nesting colonies of great blue herons, establish a 300-foot buffer zone from the periphery of the colony when conducting projects that might cause disturbance to nesting birds (e.g., concentrated recreation activities that involve prolonged stopping, helicopter or fixed wing flights within 1,000 feet, blasting).

Common loon

In northwest Montana, multiple partners could continue to be involved in protecting active nesting territories of the common loon in a variety of ways, such as through the use of loon education personnel, shoreline signs, floating signs, and/or nesting platforms. Possible strategies that might be used in support of FW-DC-WL DIV-01 and FW-GDL-WL DIV-05 are the following, which have been recommended by

the Common Loon Working Group (see appendices to Montana's common loon conservation plan (Hammond, 2009)):

- Identify lakes where water fluctuation is a primary cause of nest failure and coordinate with local water control agencies to mitigate water fluctuations where possible. Otherwise, consider the use of floating islands.
- Record locations of all current, past, and suspected nesting and nursery sites.
- Identify location, type, and impacts of current and probable future disturbance on nesting and nursery habitat.
- Place floating signs around known nest locations and on the shoreline.
- Identify historic and current public issues, concerns, and conflicts (e.g., lakeside trails, float plane use, fishing pressure).
- Identify the amount of information and education effort needed.
- Reduce the impacts of existing and future shoreline development on lakes that provide quality loon habitat.
- Maintain and enhance mitigation efforts to minimize effects of shoreline disturbance on nesting loons.
- Apply the Loon Conservation Plan and best management practices before choosing sites for developed recreation facilities on the shores of lakes.
- Implement generic recommendations and considerations for the use of artificial nesting platforms and floating signs.

Water howellia

Water howellia is currently listed as a threatened species by the U.S. Fish and Wildlife Service. It occupies vernal pothole ponds in the bottom of Swan Valley on the Flathead National Forest, and this area is the only place in Montana water howellia is found. These ponds have an ephemeral nature, filling and drying according to the season. Water howellia reproduction has adapted to these ponds.

A conservation strategy for *Howellia aquatilis* was released by the Forest Service in 1994 (updated in 1996), with the following goals:

1. Protect documented and new occurrences on Forest Service lands in Montana, in order to maintain the species' current geographic distribution pattern and the integrity of the Swan Valley meta-population. Occupied ponds on Forest Service lands should be maintained in a condition that retains the physical features necessary for long-term occurrence persistence (Lesica¹ 1992). This will involve protection of the vegetative, hydrologic and geomorphologic conditions that determine natural seasonal inundation and drying patterns of the vernal pond habitat.
2. Maintain unoccupied, suitable pond habitats in suitable condition, as they represent potential colonization sites. These potentially suitable ponds should be identified through field surveys by persons familiar with the species' habitat requirements. This goal is in agreement with the recommendation by Lesica¹ (1992) that wetland complexes containing numerous extant

¹ Lesica, P. 1992. Autecology of the endangered plant *Howellia aquatilis* (Campanulaceae); implications for management and reserve design. *Ecological Applications* 4: 411-421.

occurrences as well as unoccupied ponds of varying depths are needed for long-term maintenance of meta-populations.

3. Allow aquatic and adjacent upland vegetation to recover in previously disturbed ponds, including occupied ponds as well as unoccupied but suitable ponds.

Flathead forest plan direction is designed to be consistent with and to incorporate applicable guidance from the conservation strategy. Forest plan direction relevant to protection of water howellia habitat and conducting activities adjacent to ponds are found in several different sections of the plan, including the following: Watersheds; Riparian management zone; Soils and geology; Non-native invasive plants; Threatened, endangered, proposed or candidate plant species; MA 3b special areas (Condon Creek botanical area); and Swan Valley Geographic Area.

Possible approaches and strategies associated with forest plan direction related to water howellia

Vegetation management (such as harvest, prescribed fire)

FW-GDL-PLANT-01: Ground-disturbing vegetation treatments within 300 feet of ponds providing habitat for *Howellia aquatilis* should occur only if the vegetative, physical, and/or hydrological features required for long-term habitat conservation are maintained or improved. Treatments should develop vegetation conditions consistent with natural ecological processes and should sustain soil quality and functioning to support the long-term persistence of *Howellia aquatilis*.

DC, STD, and GDL in RMZ section of the Plan: All direction in the riparian management zone section of the plan is applicable to the 300 foot zone that surrounds water howellia ponds; however direction related specifically to activities adjacent to water howellia ponds (such as FW-GDL-PLANT-01) is generally more restrictive than for other water bodies.

Approaches and strategies associated with FW-GDL-PLANT-01:

- One of the main purposes of the 300 foot zone is to maintain the structural and floristic diversity of the forests, especially the mid to late-successional forests where they are present. This would be considered in proposal and design of potential activities.
- Activities that are more similar to natural processes (understory burning, hand thinning to replicate canopy gaps and remove understory fuels) or preventative (beetle kill prevention and fuels reduction) would be most appropriate to conduct in the 300 foot zone
- Activities that would remove substantial amount of forest canopy cover and/or use mechanical equipment over unfrozen ground would be restricted. Site specific analysis will determine whether there could be exceptions to these types of activities. Possible mitigation measures that could occur when conducting activities could include:
 - Minimize soil disturbance by using mechanical equipment over-snow or frozen ground
 - For prescribed fire, avoid digging fire line in the 300 foot zone, allowing fire to spread naturally into the zone
 - If the 300 foot zone is bisected by a road, the activities may be able to occur on the opposite side of the road from the water howellia pond. Since the pond hydrology has been impacted by the road prior to listing, yet still provides habitat for water howellia, the outside buffer area does not seem to affect the local hydrology of the pond to negatively impact water howellia.

- Fuels reduction, such as broadcast burning and manual understory removal are acceptable treatments within the 300 foot zone. To avoid or minimize weed infestation and spread:
 - Avoid building fire lines within the 300 foot zone
 - Avoid piling slash within the 300 foot zone
- Reforestation is discouraged within the 300 foot zone, unless implemented on the opposite side of the road from the pond. Site specific analysis will determine if there might be exceptions, such as planting shrub or deciduous canopy cover for soil stabilization and species diversity.
- Seeding of disturbed areas and roadsides adjacent to and within the 300 foot zone is encouraged to deter establishment of weeds. Using an appropriate, native species grass and/or forb mix is required, and should be approved by the forest native plant coordinator.
- Other vegetation management activities may be appropriate if necessary for maintenance of integrity within the 300 foot zone, and will be determined at the site-specific level. The analysis of effects would include how activities relate to natural processes and to the effect on *Howellia aquatilis*. In any case, if human alteration were to occur, the width and percent canopy of the 300 foot zone should be adequate to prevent loss due to blowdown (Saunders et al. 1991²).
- Future management activities near occupied ponds should address the landscape context in which the ponds are situated. Animals that are potentially dispersing seeds between ponds need corridors for such movement. This landscape-level approach is important for the maintenance of meta-population dynamics (specifically, the ability of the species to colonize suitable, unoccupied habitats) (Lesica 1992).

Road management

FW-GDL-PLANT-01: Road maintenance on roads within 300 feet of ponds providing habitat for *Howellia aquatilis* should maintain or improve hydrological integrity to protect habitat conditions for *Howellia aquatilis*.

Approaches and strategies associated with FW-GDL-PLANT-01:

- For the occurrences of *Howellia aquatilis* that are located near existing gravel roads, future road maintenance activities should avoid the pushing of gravel or other material into the pond.
- New road construction (permanent or temporary) is restricted within the 300 foot zone, unless site specific analysis indicates there would not be adverse effects to water howellia. An example of a situation may be where there is already an existing road bisecting the 300 foot zone, and the new road is proposed on the opposite side of this road relative to the pond and outside the catchment basin of affected ponds.

Invasive species control

FW-GDL-PLANT-01: To protect habitat conditions for *Howellia aquatilis*, water drafting (for invasive plant control or fire management activities) should not occur in occupied or unoccupied but suitable water howellia ponds.

² Saunders, D.A., R.J. Hobbs, and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. *Conservation Biology* 5: 18-32.

FW-DC-NNIP-01: Native plant species and plant communities dominate the landscape, whereas invasive plant species are at low abundance or non-existent, especially in areas identified as high priority, including wilderness areas, native grassland plant communities, riparian areas (particularly those associated with water howellia ponds), research natural areas (management area 4a), around known populations of plant species of conservation concern³, and in special areas (management area 3b).

FW-DC-NNIP-02: No new non-native invasive plant species become established in terrestrial or aquatic plant communities on the Forest.

Approaches and strategies associated with these desired conditions and guideline:

- Assign a high priority for treatment of invasive species to water howellia ponds and adjacent 300 foot zone. Control activities would be designed to not have adverse effect to water howellia.
- Use chemicals appropriate for the specific site conditions, and avoid spraying chemicals into ponds
- Other non-chemical activities may be applied, such as mulching reed canarygrass infestations, burning, mechanical treatment and biological treatments, as long as they avoid disturbance of soil that would potentially allow new infestations or increase spread of existing infestations.

Other management actions and possible approaches

In active grazing allotments: Conduct periodic monitoring of occurrences of water howellia in order to determine if direct impacts to occupied pond habitat are occurring. If so, fencing may be needed around such ponds.

Continue cooperation with the U.S. Fish and Wildlife Service, Montana Natural Heritage Program, The Nature Conservancy, private landowners and other interested parties, in identifying and protecting all occupied and potential habitat.

Recreation activities typically do not cause adverse impact water howellia ponds, as the ponds are often not easily accessible on foot or by vehicle. An exception may be ponds that are adjacent to roads; however, these areas are generally not conducive to recreational activities.

Soils

The forest plan desired condition is to maintain soil productivity and improve soil functional attributes where impaired. The regional soil standards in the Forest Service Manual (FSM_2500-2014-1) define terms and methods to analyze projects for soil productivity. Specific guidance on sampling protocol is given in the USDA publications “Forest Soil Disturbance Monitoring Protocol,” volumes 1 and 2 (Page-Dumroese, Abbott, & Rice, 2009a, 2009b). These manuals rely on soil disturbance criteria to evaluate soil condition against soil disturbance thresholds. The assumption is that long-term and/or permanent impairment to productivity could occur if soil disturbance is above these thresholds; soil disturbance below these thresholds provides some level of assurance that soil productivity will be maintained.

Possible approaches—Standards and guidelines

Soil specialists evaluate site conditions and work with planning teams to design projects and minimize or eliminate potential effects. Standards and guidelines are used to reduce project effects and promote soil productivity. These plan components are designed with the intent of minimizing the intensity and severity

³ Species of conservation concern are identified by the Regional Forester; more information is available at <http://bit.ly/NorthernRegion-SCC>.

of soil disturbance to ensure that the site can sustain the expected soil and vegetation composition. Put more simply, leaving soils in place and in good condition helps ensure that soils will remain productive. As part of these assessments, specialists characterize the risk of mass wasting and the potential consequences of working on unstable landforms.

When determining detrimental soil disturbance, specialists use professional judgement and also consider the physical, chemical, and biological functions of soil productivity to provide context for analysis. These functions relate to the ability of soil to transmit air and water through the soil matrix, store water and nutrients, provide habitat for micro and macro invertebrates, provide substrate for plants, and resist wind and water erosion. Knowledge of how changes in soil properties over time restore important soil attributes such as groundcover and forest floor is needed to describe effects from management and prescribe reclamation.

As an example, rehabilitating a temporary road may increase the soil water storage and ability to infiltrate runoff in the short term, but the soil microbe composition may recolonize much more slowly over time as organic matter rebuilds on a site. Thus, the physical function may rebound quickly, but the soil's biological function requires a much longer time frame. Since soil composition is highly variable, the best method of evaluation is to use adjacent areas and similar landforms as reference analogues.

Potential road rehabilitation methods and approaches

Forest plan standards FW-STD-SOIL-03 and FW-STD-SOIL-04 require rehabilitation of soil function on temporary roads when management activities are completed or when decommissioning existing system roads. The standards apply to roads used in future management actions. The standards state that rehabilitation treatments would be based on site-specific characteristics and use methods that have been demonstrated to measurably improve soil productivity. Rehabilitation treatment designs would rely on assessment of soil functional attributes since the intent is to actively rebuild the site towards recovery rather than focus on minimizing disturbance.

Management approaches and examples for rehabilitation treatment prescriptions that could measurably improve soil productivity may include but are not limited to any site-appropriate combination of the following:

- Remove installed culverts, existing culverts, or temporary bridges.
- Restore hillslope hydrologic function:
 - ◆ Recontour the entire template to natural ground contour.
 - ◆ Partially recontour the template to reestablish drainageways and ensure an outslope along the old template; deep rip the existing roadbase; remove unstable fills; pull back road shoulders.
 - ◆ Where full or partial recontouring is unnecessary, scarify with excavator teeth to a depth sufficient to ameliorate the presence of detrimental soil compaction (usually between 2 and 12 inches)
 - ◆ Leave the template as is if natural processes are determined sufficient.
- Restore biological function:
 - ◆ Inoculate soil using adjacent forest floor and mineral soil
 - ◆ Seed with the native plant mix as specified by the Forest botanist
 - ◆ Place woody material on the template

- ◆ Transplant native shrubs/trees to augment natural vegetation

Possible approach for developing rehabilitation treatment prescriptions

The goal is to rehabilitate the road to improve long term soil and vegetation growth. Rehabilitation treatments can have mixed effects depending on the site constraints, so an assessment needs to consider the following: (1) does the existing condition warrant any further work, (2) can rehabilitation improve the current condition, and (3) where could the rehabilitation actually make a difference?

First, assess the site to understand how likely it is that the site will regenerate and rebuild soil and vegetation. Considerations might include:

- soil type—for example, road fill derived from adjacent deep soils in topographic depressions will have greater fertility for reclamation than the thin soils typical of belt rock hillslopes;
- site moisture and productivity—for example, moist sites will generally have greater restoration potential; and
- aspect and adjacent forest conditions—for example, north aspects or shade from adjacent forests can help sustain soil water to reestablish vegetation.

Second, evaluate the level of hillslope work needed to reestablish overland and soil throughflow.

Third, evaluate the level of revegetation needed to stabilize the soil surface and encourage the slow process of rebuilding the soil's biological function. For example, amending the site with wood slash may provide cover and microsites to foster growth.

Examples of rehabilitation treatment prescriptions

A temporary road constructed to access timber could require recontouring of the roadbed to match the natural terrain to ensure adequate slope drainage. Reestablishing the hillslope's natural contour may restore some level of hillslope throughflow and avoid channeling runoff, while reducing risk of hillslope sloughing along the roadcut.

A partial recontouring could be considered when a road that needs to be decommissioned has forest above and below the road along a moderately sloped hillslope. The partial recontouring may only be needed to shed water and prevent erosion of the road. The shade from the trees would do more to facilitate revegetation in the outsloped road area since less work would be done to prepare the soil. Not recontouring might leave less topsoil available to rebuild soil and grow vegetation.

When decommissioning a road to remove it from the administrative system, the rehabilitation may not require full recontouring if conditions would allow the slope to revegetate and stabilize naturally, such as in moist or wet soil conditions. Decades-old road templates may have already rebuilt soil and vegetation conditions to some degree. Depending on the setting, active work might disturb sites and result in setting back the recovery trajectory further than would leaving the road template alone so it can continue rebuilding soil and reestablishing plants.

Terrestrial Vegetation and Vegetation Treatments

The following subsections describe potential management strategies and possible actions at both the landscape and stand level for plan components related to terrestrial vegetation. These strategies and actions are intended to provide guidance for plan implementation; they represent possibilities, preferences, or opportunities rather than obligatory actions. Under the adaptive management approach, proposed strategies and actions are dynamic (changeable, augmentable, or replaceable) so as to be

responsive to results of new research, practical experience, and other information and observations. In association with these strategies, refer also to appendix D for information on broad potential vegetation types.

Desired conditions—General information

Analysis of natural range of variation is the underpinning of the desired conditions for terrestrial vegetation, with integration of additional factors such as habitat needs for at-risk wildlife species, existing or anticipated human use patterns, consideration of changing climate, and ecosystem services that may be desired or expected of the Forest (such as reduction of fire hazard or production of forest products). Trechsel (2016) provides a detailed explanation of how plan components for the desired conditions were developed; Trechsel (2017b) provides the results of the natural range of variation as modeled for vegetation characteristics and their relationship to the desired conditions.

Forest Inventory and Analysis data (R1 Summary Database) is the source for most of the quantified existing conditions for vegetation components (e.g., vegetation dominance types, species presence, forest size class, forest density, old-growth, snags and downed wood, large live trees). This data provides information and estimates appropriate for use at the broad scale of analysis, such as the Forest or a geographic area, but is not spatially explicit. Field verification of vegetation conditions and components is expected to occur at the project level using a variety of methods, including field surveys.

Many desired conditions for vegetation characteristics are described in the plan, and there are no implied priorities except those that may be expressed by a corresponding objective (for example, FW-OBJ-TE&V-02, which is associated with the restoration of western white pine). Ranges in vegetation conditions are expressed for some desired conditions. Maintaining vegetation conditions anywhere within this range would be considered acceptable in terms of meeting the desired condition. Fluctuations in vegetation conditions over time are expected. Managing a particular vegetation characteristic at the upper, lower, or midpoint of the desired range may be determined to 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).

Natural disturbance processes (such as fire) and succession, as opposed to vegetation management treatments, are expected to be the primary drivers of vegetation change on the Forest overall because of the large areas of wilderness and roadless lands that are both relatively inaccessible and/or identified as unsuitable for timber production. Forestwide, this means there is limited opportunity for active vegetation management actions, particularly mechanical treatments such as timber harvest, to influence vegetation change. However, there are portions of the Forest (such as the Salish Mountains geographic area) and key potential vegetation types (such as the warm-moist type) where the effects of active vegetation management actions have greater potential and opportunity to influence vegetation conditions and contribute to maintaining or moving towards desired conditions.

Project-level considerations

The time scale is important to acknowledge when interpreting and applying desired conditions at the project level. Desired conditions for vegetation should be viewed and interpreted from both short-term (i.e., the “life of the plan,” which is 15 years) and long-term perspectives. 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 (i.e., a few decades), while trending towards desired conditions over the long term. The short-term variations are due not only to the nature of successional changes and disturbance-induced changes, but also because of the discrete classifications that are of necessity applied to vegetation for planning purposes (such as the five distinct forest size classes). In

reality, vegetation condition and change occurs along a continuum over time. To accurately reflect this, a relatively long-term perspective is necessary for appropriate interpretation and evaluation. The long-term monitoring provided by Forest Inventory and Analysis data at the forestwide scale provides a means to appropriately interpret and evaluate vegetation change (refer to chapter 5 in the forest plan).

Spatial scale is important to acknowledge in the application of desired conditions at the project level. Vegetation desired conditions in the forest plan are described at the forestwide scale; specific desired ranges of structure, composition, or pattern, for example, are not necessarily appropriate nor expected to apply across smaller scales, such as an individual project area. Stand-level decisions and treatments are made at the site-specific level and should be designed to contribute to the achievement of relevant vegetation desired conditions at the forestwide scale.

Desired conditions essentially provide the reason, the “why,” for proposed management actions on the Forest. Individual vegetation management projects may focus on contributing to one or more forestwide desired vegetation condition, but not all desired conditions need to be the focus of a particular project. However, implementation of treatments that achieve one or more desired conditions at the project level cannot 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 would be determined based on the unique ecological opportunities and capabilities of each project area, as well as other resource considerations, and on the instructions provided by the deciding official.

When designing projects and developing prescriptions, it might seem that desired conditions could be in conflict with one another. An example of this situation, and the factors to consider, is described as follows.

A purpose for a project may be to reduce Douglas-fir, increase ponderosa pine, reduce high-density forests in the warm-dry type, lower risk and loss of trees to insects/disease, and increase forest resilience, as well as provide timber outputs and contribute to economic sustainability (FW-DC-TE&V-03, 05, 08, 13, 22 and FW-DC-TIMB-01, 02, 03, 04, 07). To meet these desired conditions, very large trees may be removed, which might appear to conflict with FW-DC-TE&V-10 and 11, which indicate that the very large tree size class is at or below the desired conditions forestwide. However, forestwide and over the long term, achievement of desired conditions for the very large forest size class or very large tree component would not be precluded, for a number of reasons, including the following.

As mentioned earlier, spatial scale is an important consideration. The lands where forest conditions are most likely to be influenced through harvest or other mechanical treatments (i.e., lands suitable for timber production) covers only about 19 percent of the Forest area. In addition, vegetation treatments on these suitable lands would be limited by other factors, such as budget levels and plan direction related to other resources (such as wildlife habitat). Forest succession is the means by which very large trees will develop, and across the vast majority of the Forest, natural mortality and disturbances (such as fire or insect activity) will continue to be the primary means by which very large trees will be removed.

The time scale is also an important consideration. Active management, particularly mechanical treatments, on the limited portion of the Forest suitable for timber production is an important component of the overall management strategy on the Forest for developing and sustaining larger trees of desired species over the long term. Active vegetation management is expected to facilitate more rapid successional development of trees into the larger size classes, particularly of the desired species of very large trees (FW-DC-TE&V-12). Active vegetation management is expected to contribute towards achieving desired forest densities, species, and structures that are resilient to disturbances and other stressors, improving the potential for survival of the larger trees over time. Harvest of larger trees within these parameters addresses and achieves these desired conditions, and would not preclude the attainment

of desired conditions forestwide over the long term related to very large tree sizes. The analysis of anticipated future trends in forest size classes (see section 3.3.4, forest size class, in the final EIS) suggests that at the forestwide scale the very large forest size class remains near current conditions over the five decade model period, with the likelihood of increasing in the period beyond 50 years. The presence of very large trees across the landscape also appears to be sustainable over time, and likely increasing, due to the strong upward trend in the large forest size class.

Plan components are integrated and interconnected and, as a whole, designed to work together to provide for social, economic, and ecological sustainability and multiple uses, as required by the planning rule (36 CFR § 219.1; directives in Forest Service Handbook 1909.12 chap. 20 sec. 22). For example, guidelines and standards are established that help achieve or maintain the desired conditions for very large live trees when conducting vegetation management activities (e.g., live tree retention under FW-GDL-TE&V-09; treatments in stands adjacent to old-growth forest FW-GDL-TE&V-06).

Coniferous forest types

The following strategies related to forest vegetation could be used at the programmatic or project-level stage to support the maintenance or achievement of desired conditions, standards, and guidelines for coniferous forests.

General strategies

- Develop a set of integrated target stands for the Flathead National Forest to provide a consistent basis for the development of site-specific vegetation treatment prescriptions. Such target stands could integrate elements of vegetation composition and structure with wildlife habitat, fire and fuels management, soil and water resources, and socioeconomic aspects (e.g., recreation, scenic integrity, timber production). The desired conditions and other forest plan components provide a framework and footing for development of these target stands.
- Consider climate change adaption strategies when developing elements of site-specific silvicultural prescriptions, such as when choosing species to plant and determining planting densities. For information on forest conditions and forest management strategies related to potential climate change that are relevant to landscape and stand-level prescriptions on the Flathead National Forest, refer to documents produced by the Northern Rockies Adaptation Partnership (NRAP) (Robert E. Keane et al., in press), the Reforestation-Revegetation Climate Change Primer for the Northern Region (Scott, Mahalovich, Rinehart, & Krueger, 2013), and other publications as they become available.
- Evaluate areas proposed for vegetation management activities for the presence of occupied or suitable habitat for threatened and endangered plant species and plant species of conservation concern, which may include conducting pre-field review and field surveys, provides opportunities for mitigation and protection to maintain occurrences and habitats that are important for species sustainability.
- Complete effectiveness evaluations of fuel treatments to help in understanding how hazardous fuels treatments affect wildfire behavior, fire severity, and fire-suppression effectiveness.

Strategies specific to each broad potential vegetation type

The following vegetation management strategies and examples of management actions focus on maintaining or increasing representation of desired forest compositions, structures, and patterns. Specific vegetation activities may include timber harvest, prescribed fire, planting, pruning, precommercial thinning, commercial thinning, and mechanical fuel reduction.

Warm-dry potential vegetation type and drier portions of the warm-moist potential vegetation type with presence of ponderosa pine

- Thin young stands to help encourage growth and vigor of trees, and develops future large-diameter ponderosa pine, western larch and Douglas-fir. This creates forest compositions and structures better able to survive future fire, insects, disease, drought, and other disturbances and provides seed sources for future forest regeneration after disturbance.
- Plant ponderosa pine in locations where planting is typically needed to ensure its successful establishment.
- Design treatments in a way that favors the retention and increases the proportions of ponderosa pine and, on more mesic sites, the retention and increase of western larch.
- Reduce stand densities and inter-tree competition to help increase resilience to drought that may be associated with future climates and meet desired conditions with respect to fire behavior.
- Harvest midstory trees across large areas of mature forest to trend towards an increase in the average patch size of coniferous forest; combine this with regeneration harvest or prescribed burning to create early successional forest patches interspersed with mature stands, as would occur with mixed-severity fire.
- Design timber harvest and prescribed fire to create a landscape mosaic with a variety of canopy cover classes, dense understory thickets of trees and shrubs, and gaps in the forest canopy. Understory thickets can be left in areas where they do not act as ladder fuels that carry fire into the crowns of trees. Ponderosa pine and Douglas-fir live trees and snags greater than 20 inches d.b.h. could be retained where present.

In key winter habitat areas for ungulate species

To implement GA-HH-DC-02, GA-NF-DC-08, GA-SM-DC-05 and 06, GA-SF-DC-04, and GA-SV-DC-05, USFS wildlife biologists could identify key winter habitat areas in cooperation with MFWP at the start of project implementation. Key areas are typically lower-elevation areas in the warm-dry or warm-moist potential vegetation types. These key areas provide interconnected patches of mature trees with an overstory canopy to provide snow intercept cover during harsh winters, interspersed with patches providing forage. The density of trees needed to provide snow intercept cover varies according to tree species composition and elevation and is best determined on a site-specific basis.

Examples of stand- and landscape-level prescriptions and strategies that would provide sufficient snow intercept cover include the following:

- In mixed-species stands dominated by ponderosa pine and Douglas-fir, harvest trees of intermediate size to reduce the midcanopy stand density and total basal area to 80 ft² or less; this creates parklike forests with Ponderosa pine and Douglas-fir in the uppermost canopy and a stand structure that is more resilient to drought and stand-replacing fire while meeting the needs of deer and elk.
- Another possible strategy could apply in key winter habitats such as the Firefighter area, where elk now use higher elevations in winter due to the flooding of Hungry Horse Reservoir. In this area, lodgepole pine stands provide snow interception. Use thinning to develop full-crowned trees, but because lodgepole has a relatively small crown, a higher density of trees would need to be retained to provide snow interception.
- At the landscape scale, consider both short- and long-term desired winter range habitat conditions. This may include strategically locating regeneration harvest areas (where conversion to more desired species such as Douglas-fir may occur) among unharvested areas (that remain to provide

snow intercept cover). For example, in the Dry Park and Horse Ridge big game winter habitat areas near the South Fork of the Flathead River, steep west-facing or south-facing slopes are used by wintering elk even though they have very little tree cover. These slopes receive relatively high amounts of wind and sun, even in winter, so not much snow accumulates. In these areas, it is important to maintain a canopy of full-crowned conifer trees on benches where animals bed down, but prescribed burning and/or slashing could occur along the boundaries of open areas if needed to improve forage condition.

- In all types of winter habitat, patches of dense trees in the understory—to provide wind protection and arboreal lichens for feeding—are desirable. Retain dense patches of small trees and shrubs in areas where they do not conflict with desired conditions for fuels management. Use prescribed fire to promote an understory consisting of small patches of grasses and forbs, shrubs, and small trees.

Warm-moist potential vegetation type (except sites with presence of ponderosa pine)

- Promote an increase in the presence of western white pine by harvesting and planting; by planting in areas burned by fire; and by thinning or pruning within existing sapling stands.
- Plant western larch (if a reliable seed source is not present) to ensure successful establishment. Thin western larch in the sapling stage, where possible, if necessary to ensure continued presence and growth.
- Thin young stands (e.g., sapling-size trees) to reduce stand densities and inter-tree competition, and encourage the growth and vigor of trees and the development of future large-diameter western larch, Douglas-fir, western white pine, and western red cedar. These activities create forest compositions and structures better able to withstand fire, insects, disease, drought, and other disturbances as well as provide seed sources for future forest regeneration after disturbance.
- Conserve existing large live trees and snags greater than 20 inches d.b.h., where available, as well as large downed wood.
- Focus on sites where western red cedar or western hemlock currently has, or has the potential to achieve, larger diameters and, possibly, late-successional or old-growth forest in the future, where it is desired to encourage the presence of these species. Treatments might maintain overstory shade to protect understory trees while reducing stand densities overall to promote tree growth and development into larger diameter trees.
- Protect existing old cedar groves by managing surrounding stands to lower the risk of high-severity fire. Management activities may include reducing tree densities and downed woody material.

See also possible strategies for big game winter habitat in the warm-dry potential vegetation type section of this appendix (most winter habitat is located in warm-dry or warm-moist potential vegetation types).

Cool-moist potential vegetation type

- Promote an increase in the presence of western white pine on the more mesic, warmer sites by regeneration harvest and planting, by planting in areas burned by fire, and by thinning or pruning within existing sapling stands.
- Plant western larch (if a reliable seed source is not present) to ensure successful establishment. Thinning of western larch in the sapling stage, where possible, may also be needed to ensure continued presence and growth.
- Thin young stands to encourage growth and vigor of trees and to develop future large-diameter western larch, Douglas-fir, and western white pine in the upper canopy layers while retaining or recruiting subalpine fir and spruce in the understory to maintain/develop multistory hare habitat.

This forest structure may be more vulnerable to high-severity fire and less resilient to drought, but it provides important habitat conditions for the threatened Canada lynx. The presence of large-diameter overstory trees of fire-tolerant desired species compositions improves tree survival in moderate- or mixed-severity fires, provides potential seed sources for post-fire regeneration, and provides nesting/perching habitat for numerous bird species. Promoting western larch may also reduce losses due to insects and disease.

- Conserve existing large live trees and snags greater than 20 inches d.b.h., where available.
- Harvest trees in mature forest for fuel treatment in the wildland-urban interface, or in the stem exclusion structural stage, to increase resilience to anticipated future climates and to meet desired conditions with respect to fire behavior. In other areas, increase the presence of western larch, particularly as larger tree components, in overstory canopy layers and in areas dominated by lodgepole pine to promote species tolerant of insects, disease, and fire and species that have the potential to provide high-quality habitat for cavity-nesting and -denning species.
- Create openings in areas of moderately to densely stocked mid-successional forest (particularly areas dominated by pole-sized lodgepole pine) to develop a mosaic of successional stages, to increase forest structure, and to promote species diversity.

Cold potential vegetation type

- Plant whitebark pine seedlings (or seeding) in areas widely distributed across the Forest.
- Identify whitebark pine trees and stands that contain phenotypically resistant trees for cone collection, seed production for natural regeneration, and scion and pollen collection.
- Reduce stand density and fuels around phenotypically resistant trees by thinning or felling of other tree species to improve stand resilience and lower fire hazard.
- Conduct insect-control activities, such as applying pheromone packets.
- Thin sapling or larger-sized whitebark pine stands.
- Conduct prescribed burning on sites that best support whitebark pine establishment and growth (either by natural regeneration through seed caching by the Clark's nutcracker or by planting).

Objectives—Possible actions and strategies

Possible actions to achieve the objectives for coniferous forests are listed below. This list is not all-inclusive; it represents those actions most likely to positively contribute to the specific objective. Strategies could include the use of single methods or practices or the use of combinations of methods and practices. The specific actions chosen would depend on numerous factors, such as site-specific forest conditions and other management objectives for the area. Additionally, treatments may be designed to meet more than one objective. For example, planting western white pine seedlings would meet both objectives FW-OBJ-TE&V-01 and 02.

FW-OBJ-TE&V-01. Vegetation management treatments (e.g., timber harvest, planned ignitions, thinning, planting) on 62,000 to 174,000 acres of the Forest to maintain or move towards achieving desired conditions for coniferous forest types and associated wildlife species, and for other resources.

Possible actions include the following:

- Use regeneration harvest methods, implementing even-aged, two-aged, or uneven-aged silvicultural systems (e.g., clearcut, seed tree, shelterwood, or group/single tree selection).

- Use intermediate harvest methods (e.g., commercial or precommercial thinning, sanitation, or salvage cut).
- Plant conifers to reforest areas after harvest or fire.
- Use mechanical methods (e.g., excavator scarification) or prescribed fire to prepare sites for reforestation.
- Conduct post-fire salvage harvest or salvage after epidemic insect infestations.
- Manage fire (i.e., prescribed fire and wildfire) to achieve desired vegetation structure, composition, pattern, and function.
- Conduct mechanical treatments, including commercial and/or noncommercial treatments, to alter forest structure and fuel loadings.
- Treat insects and disease using integrated pest management practices.

FW-OBJ-TE&V-02. Vegetation management treatments (e.g., timber harvest, planned ignitions, thinning, planting) occur on 16,000 to 21,000 acres of the Forest to contribute to restoration of blister rust-resistant western white pine and achieve desired conditions for this species' presence across the landscape.

Possible actions include the following:

- Prune or daylight thinning western white pine to reduce the incidence of blister rust.
- Plant rust-resistant white pine to reforest areas after harvest or fire.

Old-growth forests

The desired condition FW-DC-TE&V-14 recognizes the importance of both maintaining existing old-growth forest and fostering the long-term development of old-growth forest. Old-growth forest is dynamic; old-growth forest will be lost to stand-replacing wildfire and other disturbances, but it will also be gained through natural succession of vegetation. Forest plan direction for old-growth forest supports the enhancement of the successional process towards old growth that could be achieved in some stands through management activities.

Old-growth forest provides habitat for old-growth-associated species, with verification of habitat conditions occurring at the project-level. Old-growth forest is defined by specific structural attributes and other characteristics, as described in the Forest Service publication *Old-Growth Forest Types of the Northern Region* (Green et al., 2011). Pages 11-12 of the publication describe how to appropriately use and apply these definitions at the project level. A crucial point is the expectation that interpretation and flexibility will be applied at the project level to identify old-growth forest, using field surveys to discern structural characteristics (both the numerical criteria and associated characteristics). Reasons for this include the great variation in old-growth stand structures and the uncertainties that may be associated with sampling and statistics, as discussed in Green et al. The specific forest conditions required to qualify as old-growth forest, and the associated characteristics that influence its quality (such as snags, defective live trees, and downed wood), may be unevenly distributed and thus not accurately estimated through statistical means. When verifying old-growth forest, wildlife and vegetation specialists (e.g., silviculturists) are expected to contribute their professional judgement and work cooperatively in field review and analysis at the project level.

Monitoring old-growth forest occurs at the forestwide scale and is based upon the statistically quantifiable and measurable key characteristics that define old-growth forest (basal area, trees per acre, d.b.h., and age). This provides a means to determine statistically sound quantitative estimates of the existing amount

and trend of this key ecosystem characteristic over time at the broad scale and to know the reliability of the estimates. Refer to the monitoring guide for more information on monitoring old-growth forest.

Project-level considerations

At the project level, verification of old-growth forest locations across a landscape may or may not be necessary, depending upon the purpose and need of the project and the landscape vegetation conditions. When needed, verification of old-growth forest would be accomplished through field methods, which might include plot surveys, transects, or walk-through surveys.

In areas where the project purpose includes addressing old-growth forest conditions at the landscape scale (e.g., the size, shape, structure, and connectivity of old-growth forest patches), possible management approaches may include the following:

- Retain existing stands that have the potential to develop into old-growth forest over time where they are adjacent to existing stands of old-growth forest.
- Emphasize the selection of stands for treatments that promote development of future old-growth forest in watersheds where existing old-growth forest conditions are considered less than desirable, such as where the shape of old-growth forest patches are largely linear and narrow, where the old-growth forest pattern is relatively fragmented across the landscape with smaller patches (i.e., average less than 100 acres), and/or where there is poor connectivity of patches.
- At the project level, assess old-growth forest patch size by analyzing the amount of high-contrast edge between old-growth forest and openings. This may be accomplished through use of a GIS buffer tool to assess the distance to high-contrast edge within old-growth forest patches.
- Treat stands adjacent to or near old-growth forest with the goal of reducing fire hazard, altering potential fire spread or fire severity, or reducing potential insect or disease outbreaks that might result in loss of old-growth forest.

Long-term persistence of old-growth forest on the Flathead National Forest is closely tied to forest plan components and guidance related to the development of resilient forests, with a particular focus on promoting the presence of fire-resistant, large-diameter, long-lived trees across the landscape. In other words, many of the desired conditions for vegetation characteristics (e.g., forest composition and size classes), and the standards and guidelines developed to achieve those desired conditions, also contribute to the long-term development of old-growth forest. For example:

- The desired condition for vegetation composition promotes increase of ponderosa pine, western larch, and western white pine, which are species that are long-lived and can achieve very large sizes, are resilient to fire once they reach sufficient size, and are of relatively high value for wildlife when they become decayed and snags or downed wood.
- Desired conditions for forest size class promote an increase in large and very large forest size classes, which are strongly associated with old-growth forest conditions.
- The live reserve tree retention guideline (refer to the discussion later in this appendix under “Live reserve tree guideline”) contributes to the maintenance and development of very large trees, particularly those with the potential to survive fire and contribute to long-term forest structural diversity. The guideline also helps retain trees that may contribute to future large snag components when they die. These components are key features of old-growth forests.
- Forest plan direction related to snags, snag replacements, and downed woody material focuses on the retention of the largest, highest-quality snags and snag replacements. These components could

contribute to the dead standing and downed wood structural diversity of future stands, including old-growth forest.

Other possible strategies at the stand level that may contribute to the long-term development of old-growth forest include the following:

- Retain live reserve trees over the long term within new harvest units at higher levels or with different characteristics than those that are retained to meet the live tree reserve guideline FW-GDL-TE&V-09. These trees may be small or large in diameter, healthy immature or mature trees with good growth rates and thus good potential to achieve larger size classes over relatively short time periods. Or, they may be large trees with heart rot fungi, wounds, or broken tops that predispose them to dying in the future and contributing to wildlife habitat.
- Retain more snags at higher levels than required by the snag retention standards, especially large snags, both soft and hard, arranged as solitary trees or in small clumps. In areas that are lacking the minimum number of snags specified in the standards, techniques to create nesting and denning habitat can be used, such as girdling or topping, and/or artificial structures such as nest boxes or platforms may be installed.
- Protect live or dead trees that have been retained in harvest units by posting wildlife tree signs and/or clearing fuels beneath leave trees, if units will have slash treatment with prescribed fire.
- Clear vegetation around the base of “legacy trees” (e.g., large, old, live western larch or ponderosa pine trees exceeding 25 inches d.b.h.) to increase the trees’ resilience to climate change, fire, and other disturbances.

Standard FW-STD-TE&V-01

This standard allows for vegetation management *within* old-growth forest if it meets one or more of the reasons listed and if the treatment does not “modify the characteristics of the stand to the extent that stand density (basal area) and trees per acre above a specific size and age class are reduced to below the minimum levels specified in Green et al.” (2011). In order to avoid ambiguity, these measurable criteria associated with old-growth forest are applied to determine compliance with this standard. If the deciding officer determines that, for site-specific reasons (such as to provide for human safety), a stand of old-growth forest must be treated to the extent it no longer meets the definition of old-growth forest, then a site-specific amendment to the forest plan would be required.

Treatment prescriptions within old-growth forest would be determined on a site-specific basis. Examples of vegetation management activities and approaches that could be compatible with this standard include but are not limited to the following:

- In areas where the natural fire regime is characterized by low- to mixed-severity fire that historically maintains a more semi-open forest condition, apply prescribed fire alone, or in combination with the cutting of smaller trees, in stands that contain a substantial component of fire-resistant species, such as ponderosa pine and western larch. Design treatments to emulate a low- or mixed-severity wildfire with results that maintain or restore old-growth forest characteristics and ecosystem processes, increase their resistance and resilience to disturbances or stressors, and/or reduce fuel hazards in areas where wildfires pose a threat to communities. Achieve these results in these and other ways:
 - ◆ reduce forest density by burning or removing some of the smaller-diameter understory trees (particularly the shade-tolerant species that might otherwise dominate the site);
 - ◆ stimulate the development and abundance of the grass/forb/shrub component;

- ◆ improve forest structural diversity through the creation of snags and downed wood; and
- ◆ sustain and preserve the presence and dominance of larger diameter overstory trees over time (particularly early seral, fire-resistant species) through the change in stand structure, which may increase their vigor and resistance to potential mortality from fire, insects, or other stressors (such as drought).
- Other examples of activities that could be used in or adjacent to old-growth forest stands to increase resistance and resiliency are as follows:
 - ◆ treat for non-native invasive plants;
 - ◆ do small-scale tree plantings of blister rust-resistant white pine seedlings in openings within old-growth forest that are created from wildfires
 - ◆ use anti-aggregate pheromones to prevent or minimize the loss of susceptible trees to bark beetle attacks; and
 - ◆ rake away the unnatural accumulation of bark debris from underneath ponderosa pine trees prior to prescribe burning to minimize potential tree mortality.
- Although some insect or disease infestation in old-growth forests contributes to key characteristics such as very large snags, an insect infestation (or stand-replacing wildfire) that kills most or all very large trees results in loss of old-growth forest. In this situation, use commercial or noncommercial thinning to reduce tree density, treat insect or disease infestations through integrated pest management strategies, and help protect the old-growth forest stand over the long-term.
- Selectively remove hazard trees within old-growth forest in developed campgrounds to address human safety concerns.

Guideline FW-GDL-TE&V-06

This guideline provides direction for vegetation treatments in stands *adjacent* to existing old-growth forest, with the intent of promoting development of old-growth forest over time and in larger patches that contribute to providing habitat for old-growth-associated wildlife species. The direction applies to stands in a condition that is conducive to (i.e., capable of) achieving the intent of the guideline. When determining appropriate prescriptions for stands adjacent to old-growth forest and application of the direction associated with this guideline, the vegetation specialist (e.g., silviculturist) and the wildlife biologist contribute their professional judgement and work cooperatively at the project level.

The following are examples of possible conditions that may occur in stands adjacent to old-growth forest, along with management approaches or potential treatments that might be considered to achieve the intent of this guideline.

- In mature forests that do not meet the definition for old-growth forest but have some of the characteristics of old-growth forest that are important for wildlife (e.g., large live trees with heart rot for nesting and denning, medium-sized live trees that provide bird feeding perches, larger snags, favorable species composition, and diverse stand structures), possible approaches may include the following:
 - ◆ Do not treat, allowing the stands to contribute at the level they are capable of to the adjacent old-growth forest.
 - ◆ Apply treatments to help make the stand more resilient to changing climatic conditions and/or stand-replacing wildfire or to increase wildlife habitat quality. For example, apply timber harvest and/or a low- to moderate-severity prescribed burn to remove trees in the intermediate

and lower canopy layers, reducing ladder fuels and stand densities for the purpose of increasing stand resistance to fire, epidemic levels of insect infestation, and drought. Removing trees in the intermediate canopy may also allow for development of a dense understory to improve habitat quality for species such as snowshoe hares, ungulates, or birds.

- ◆ Apply treatments that could result in the development of old-growth forest over time. Depending upon individual stand conditions, this may be a thinning of trees in the main canopy layers to improve tree growth into very large size classes or a shelterwood harvest that retains the larger overstory trees and other old-growth forest structures and regenerates to species that will contribute to the long-term development of desired old-growth forest structures and composition (such as western larch, ponderosa pine, western white pine, and Douglas-fir).
- In previous regeneration harvests dominated by young trees (i.e., saplings or small tree sizes), treatment of young stands can have a substantial influence on the future forest composition, size classes, and other structural characteristics. At the least, these treatments could widen future options to manage stands for a variety of resource objectives. Possible approaches for treatment in these young stands include the following:
 - ◆ Design thinning prescriptions to promote species composition and stand structures favorable for relatively rapid development of desirable future old-growth structures. The prescriptions may call for retention of shorter, shade-tolerant trees in the understory (such as subalpine fir) while reducing the density and improving the growth of desired trees in the main canopy layer (such as western larch). This approach to treatment retains a more diverse canopy structure and improves future forest structural diversity.
 - ◆ Retain overstory trees if present, such as the seedtree or shelterwood trees from the original harvest, or other residual trees. The live reserve tree guideline (FW-GDL-TE&V-09) might also apply and be addressed by the retention of these overstory trees.
- Lodgepole pine-dominated stands are not conducive to the development of future old-growth forest. The true lodgepole pine old-growth forest type is very uncommon on the Flathead. As described in Green et al. (2011) (old-growth type 7), it is limited to sites that are above the cold temperature limits of Douglas-fir and western larch, and it was historically characterized by open growth structure with lodgepole pine of very old ages (the average age of largest trees in the samples was 187 years), due to long intervals between stand-replacement fires. This old-growth forest type would not have historically occurred in the mid- to lower elevations or across the lands that are identified as suitable for timber production on the Flathead. Thus, harvest treatment of lodgepole pine forests that are adjacent to existing old-growth forests for the purpose of developing the lodgepole pine old-growth forest type would not generally be an appropriate treatment prescription. However, there might be opportunities to treat the lodgepole pine stand types in ways that may contribute to or complement the values associated with the adjacent old-growth forest. Possible approaches for treatment include the following:
 - ◆ Thin to reduce the potential for high-severity fire and bark beetle infestation
 - ◆ Use regeneration harvest, which would also reduce bark beetle and fire hazard, as well as allow regeneration to more desired species compositions to increase the potential for long-term development of old-growth forest stand structures and compositions.
- In mixed ponderosa pine/Douglas-fir stands on drier potential vegetation types, possible treatment approaches could contribute to restoring historical stand structures, improving habitat for associated wildlife species, and increasing the potential to develop old-growth forest structures and compositions in the future. These treatments may include the following:

- ◆ Use lower-severity prescribed fire and/or harvest (thinning or regeneration) that focuses on reducing the proportion of Douglas-fir, increasing the proportion of ponderosa pine (through planting or natural regeneration), and creating a small-patch mosaic of grassy openings, shrubs, dense patches of saplings (Douglas-fir and ponderosa pine), very large live trees, and large snags.

FW-GDL-TE&V-06 requires the retention of certain old-growth forest structural and composition components if present in the adjacent treated stands within at least 300 feet of the old-growth forest patch. The intent of this direction and possible management approaches are discussed below. Refer also to later sections in this appendix that discuss the live reserve tree guideline (FW-GDL-TE&V-09) and the standards and guidelines associated with the retention of snags and downed woody material within harvest areas, which complement and contribute to the direction in FW-GDL-TE&V-06.

- Retain larger live trees (e.g., greater than 17 inches d.b.h.) of species and condition that will persist over time (such as western larch, ponderosa pine, Douglas-fir) and not cause unacceptable impacts to future stand conditions (e.g., dwarf mistletoe infection or potential dysgenic seed source).
- ◆ Since the intent of the guideline is to develop future old-growth forest, retaining trees that would “persist over time” means that they could be expected to survive long enough to become, and/or develop into, a component of a future old-growth forest stand. Professional judgement of the vegetation specialist, working cooperatively with the wildlife biologist and considering the unique stand and landscape conditions of each stand, would provide the basis for this determination. Factors that influence the ability of or opportunity for a tree to become a component of future old-growth forest include species, presence of disease, growth potential, resistance to disturbances and stressors (such as disease, insects, drought, lower-severity fire, or wind), and current disease or other pathogens.
 - The most suitable species would likely be western larch, ponderosa pine, or Douglas-fir. Other species that might be suitable, depending on site conditions, include black cottonwood, western red cedar, and western white pine. Lodgepole pine, subalpine fir, and grand fir would generally not be considered suitable trees to retain to meet this direction.
 - Trees that are moderately or heavily infected with dwarf mistletoe would likely not be good candidates for retention to meet this guideline. Not only would their life span be shortened, but the dwarf mistletoe might spread to adjacent trees and/or the understory regeneration, which would result in long-term impacts to the stand and to individual tree growth, health, and survival.
- Retain large downed wood (greater than 9 inches d.b.h.), snags, and decayed, decadent trees greater than 15 inches d.b.h.
 - ◆ The standards and guideline for retention of snags and downed wood within harvest units (e.g., FW-STD-TE&V-03 and associated direction in each geographic area; and FW-GDL-TE&V-08) would also apply to any treatments conducted on stands adjacent to old-growth forest. However, the intent of the direction in FW-GDL-TE&V-06 is to increase the focus on retention of these components in this 300-foot minimum distance from existing old growth, leaving greater amounts of these components where they are present.

Live reserve tree guideline (FW-GDL-TE&V-09)

Very large live trees are a key ecosystem component in the Forest’s ecosystems, particularly western larch and ponderosa pine. They are important for their contribution to the diversity of forest species, structures, and ecosystem function. They provide important wildlife habitat (both while living and as snags). They

are very long lived and are the most resistant species to disturbances such as fire or insects and disease and thus have greatest potential to persist over the long term across the landscape. Due to their potential to survive fire, they are able to contribute seed to reforest burned areas, helping in their recovery and adding to the diversity of the future forest.

The intent of this guideline is to contribute to the maintenance and/or development of very large live trees of the most desirable species with respect to forest resilience and wildlife habitat. Following are some considerations and possible management approaches that could be used to achieve this intent.

- The live trees that are left in place in a timber harvest area, also known as reserve trees, serve multiple purposes and contribute to achieving other forest plan direction, such as providing seed for regeneration, helping to meet scenic integrity objectives, or serving as snag replacement trees (see discussion under snags and downed wood section later in this appendix).
- Live reserve trees may be left either individually, in clumps or in patches, as best meets both the existing distribution of desired trees and the objectives of the treatment as well as addresses other resources or treatment factors.
- If particular live reserve trees are of high value (i.e., very large diameter ponderosa pine), consider using methods to increase the probability of their survival, such as removing slash from the base of the trees prior to burning.
- Consider the scale in the evaluation and implementation of live reserve tree prescriptions at both the stand and the landscape scale. For example:
 - ♦ Individual stands vary widely in their potential to provide the desired trees for retention to achieve this guideline. It may be appropriate to take a landscape approach, rather than an individual stand approach, in designing prescriptions that achieve the intent of this guideline. For example, stands with high potential and greater numbers of suitable live reserve trees (or alternative reserve trees) could have prescriptions that retain a more abundant or diverse pattern of live reserve trees, whereas others with poor potential (such as dense lodgepole pine stands) would have few or no live reserve trees.
 - ♦ Consider the size and/or shape of the regeneration harvest unit in the development of prescriptions. For example, large harvest units would likely have a greater need for structural diversity within the opening created, especially if they are adjacent to forests with low structural diversity. If few or no suitable live reserve trees are present, alternative species, sizes, and conditions should be considered to provide the desired structure diversity in both the short and long term.

Trees that may cause unacceptable impacts to the future stand are not considered suitable reserve trees under this guideline. For example, if trees are expected to also provide a seed source for regeneration of the unit, then those that may contribute to deterioration of the regenerated stand over time need not be left. This may include trees with moderate or high levels of dwarf mistletoe or genetically based deformities. Determination of what constitutes unacceptable impacts to the future stand would be based on the professional judgement of the vegetation specialist (e.g., silviculturist) working cooperatively with other resource specialists (such as the wildlife biologist) on the interdisciplinary team.

When suitable trees (i.e., western larch or ponderosa pine greater than 17 inches d.b.h. and not considered detrimental to the future stand development) are not present, the guideline requires that alternative species, sizes, or conditions of trees should be considered for reserve tree retention. In this situation, possible approaches include (but are not limited to) the following:

- Though the intent is generally not focused on leaving sapling or small-diameter reserve trees in place of larger trees, use live reserve trees less than 17 inches d.b.h. with good growth potential as a good alternative choice for reserve trees, particularly western larch or ponderosa pine, with the intention that they would be able to achieve very large size classes over time. Leaving smaller-diameter trees of desired species and conditions might be preferable to leaving larger-size trees of less desirable species or condition (such as subalpine fir or grand fir) because of the greater long-term potential to achieve desired structural diversity and a very large tree component on the site in the future. This approach could also contribute to development of late successional or old-growth forest.
- After western larch and ponderosa pine, use the next most desirable reserve tree species, which would typically be early- or mid-successional species with some level of fire tolerance, such as Douglas-fir or western white pine, rather than the shade-tolerant late successional species. However, shade-tolerant trees may in some situations be retained to meet other intents, such as when decadent trees are providing wildlife habitat. Lodgepole pine would generally not be a good species to meet the intent of this guideline.
- In situations where it is decided that it is important to retain diseased or dysgenic trees to achieve important objectives related to other resources (for example, wildlife trees showing signs of high use, trees needed to meet scenic integrity objectives), impacts to the future stand may be avoided or minimized by considering the following approaches:
 - ♦ Plant species that are less vulnerable to insects or pathogens as a way to enable retention of diseased or susceptible overstory trees to provide desired structure and wildlife habitat. For example, in root disease- or dwarf mistletoe-infected sites where large-diameter Douglas-fir are left as reserve trees to retain important structural features and provide for future snag replacements, plant other species such as ponderosa pine or western larch, followed by precommercial thinning that selects against Douglas-fir.
 - ♦ Acknowledge and plan for the potential of disease in the future stand. Consider leaving reserve trees in small clumps rather than individually scattered through the harvest unit to limit impact to the regenerating stand. In other words, some level of disease is within the natural range of variation, so perfect health is not a requirement, even on lands suitable for timber production.
- In dense, small-diameter lodgepole pine stands, where there is a lack of either suitable or alternative species, size, and conditions of reserve trees to meet the intent of the guideline, consider retaining patches of intact lodgepole pine within the boundaries of the harvest area, particularly in very large harvest units. Though this reserve patch does not meet the intent of this guideline (e.g., they won't develop into very large, live, and persistent trees) this approach is desired to provide some structural diversity and wildlife cover values at the stand and landscape scales.
- Logging, slash removal, or site preparation methods may influence the feasibility or selection of alternative reserve tree species, sizes, and conditions of trees. The operational limitations of logging methods may influence the location or pattern of reserve trees.
 - ♦ For example, retain more reserve trees in harvest units where clippers are used and slash is scattered; retain fewer trees (especially trees of smaller diameter) on steeper slopes in harvest units where cable yarding and prescribed burning of slash occurs.
 - ♦ In some cases, retain smaller trees because of their high probability of being killed by prescribed burning of slash or windthrow if the desired condition is for them to contribute to a snag/downed wood component in an area where these components are lacking. Refer also to the discussion under the snags and downed wood section below.

Snags and downed wood

Regional snag analysis reports that summarize snag conditions within wilderness and roadless areas informed the development of desired conditions FW-DC-TE&V-15, 16, and 17 and the standards and guidelines for snags and downed wood (FW-STD-TE&V-03, FW-GDL-TE&V-08, GA-HH/NF/SF/SV-STD-01, and GA-MF/SM-STD-02); these reports are assumed to be the best source of information on the conditions of these components within areas influenced primarily by natural processes and minimal human disturbances. The forest plan recognizes that there will be high variation across the landscape in snags and downed wood, as this is both a natural condition and an accepted result of human presence and management activities. The standards and guidelines for snags in the forest plan are designed to help the Forest take an active role where needed to address the unequal distribution of snags and downed wood across the Forest. The plan components are intended to help retain snag conditions that contribute to wildlife habitat and other ecosystem benefits—not just within wilderness and roadless areas but also within areas that are more intensively managed and where snag-producing natural disturbances (fire and insects and disease) are expected to be more limited (i.e., lands suitable for timber production). Additionally, the live tree retention direction in the plan (see the previous section on live reserve trees) is also a component of the snag habitat management strategy for the Flathead in that it recognizes and promotes the long-term maintenance of key species of live trees to provide very large snag habitat for wildlife in the future.

Snag retention standards for timber harvest areas

Two different standards for minimum levels of snag retention are developed and listed in the geographic area section of the plan; a higher level of retention applies to the Salish Mountains and Swan Valley geographic areas and a lower level of retention applies to the Hungry Horse, Middle Fork, North Fork, and South Fork geographic areas. This is tied to an analysis of current snag conditions compared to estimated natural variation and disturbance patterns, the desired condition of snags distributed across the landscape, and the differences in past levels and intensity of human activities anticipated in certain management areas.

Snag retention standard clarification and factors to consider

- Snag or live, decayed/decadent species in order of desirability are (1) western larch, ponderosa pine, and cottonwood/aspen/birch, (2) western red cedar and Douglas-fir, (3) western white pine, and (4) all other conifer species.
- A variety of snag species are valuable for wildlife:
 - ◆ Ponderosa pine: high-value feeding habitat; value for nesting, although shorter in longevity than western larch (especially important for flammulated owl habitat).
 - ◆ Western larch and western red cedar: high value for feeding and nesting, highest longevity. Case-hardened western larch snags are valuable for perching (flycatchers) and drumming (woodpeckers) and may last many decades, though they may not provide nesting habitat unless they eventually get interior rot.
 - ◆ Cottonwood, birch, and aspen: high value for nesting and feeding, even when small in diameter; tops break out, and they are of high value when they rot; high value for denning. Persistent bark on snags and downed logs provides roosting habitat for bats as well as habitat for amphibians and small mammals.
 - ◆ Douglas-fir: large and very large trees with furrowed bark provide high-value feeding habitat. Although snags have relatively short longevity, they provide roosting and nesting habitat for bats and brown creepers when the bark pulls away from the tree bole.

- ◆ Lodgepole pine: high value for feeding, not often used for nesting.
- ◆ Engelmann spruce: short longevity, high value for feeding, large rootwads and boles have high value for denning.
- As required by the standard, retain all snags of western larch, ponderosa pine, and black cottonwood trees greater than 20 inches d.b.h. These are the snags that are most often of highest value for habitat on the Flathead.
- As required by the standard, retain the largest snags available above 15 inches d.b.h. (depending upon the geographic area) to meet the minimum snag density levels. In other words, if there are more than the required minimum number of snags per acre 20 inches d.b.h. or larger, then these “extra” snags 20 inches or larger should be retained, and their numbers would apply towards the total minimum number of snags per acre required for the timber harvest area.
- Consider the effect that post-harvest fuel or site prep treatments might have on retained snags. For example, broadcast/underburning on steep slopes or where post-harvest slash levels are high has greater likelihood of burning up retained snags than mechanical treatments. In these situations, the following might be considered:
 - ◆ Consider the prospect of snag creation by the post-harvest burn treatments in the prescription for snag retention. For example, where the smaller-diameter snags (i.e., 10 to 15 inches d.b.h.) have a high likelihood of being lost during the burn, live replacement trees could be left, anticipating that they might be injured or killed by the fire and thus become new snag habitat.
 - ◆ Leave greater numbers of larger-diameter live replacement trees that would have more potential to survive the burn compared to smaller live replacement trees. Resulting conditions might be a mix of dead and live but damaged trees that would provide snag habitat.
 - ◆ If particular live trees are of high value, use methods as needed to increase the probability of their survival, such as removing slash from the base of trees prior to burning.
- The capability of areas to meet the minimum snag retention levels and to provide for desired snag habitat will vary, and the approach in developing the snag retention prescription should be to do as well as possible considering the site-specific conditions and the availability of suitable snags and snag replacement trees.
 - ◆ Consider leaving all the suitable snags and decayed or decadent snag replacement trees above the minimum size required that are present in the treated stands.
 - ◆ If there are very few snags or desirable snag replacement trees, or if retained trees are susceptible to windthrow, consider leaving uncut blocks and patches within the unit (for example, in a typical high-density/low-average-diameter lodgepole pine stand). This will contribute to overall improved landscape forest structural diversity and cover/connectivity for wildlife. This approach is particularly applicable if the unit is a relatively large regeneration harvest.
- In areas adjacent to past harvest areas with few or no snags or live reserve trees, consider retaining more than the minimum number of snags and/or replacement trees to provide snag habitat in both the short and long term.
- In areas where fuel reduction is a high priority and lower densities of snags are desired, consider leaving more live snag replacement trees or decadent trees that will provide potential for a more gradual and long-term snag recruitment but will have lower potential of being a fire hazard.
- Consider leaving high stumps to provide wildlife feeding habitat.

Snag replacement tree considerations

Existing snag habitat is naturally highly variable across the landscape and over time. There will be areas where existing snag densities are naturally low and insufficient to achieve the standard. Snag replacement trees are retained primarily to provide for snag habitat in the future. In selecting individual live trees for future replacement, consider the following factors:

- Retain those species that have higher value as snag habitat—western larch, ponderosa pine, cottonwood, aspen, Douglas-fir, and western red cedar.
- The first choice for replacement snags are the largest decadent/decayed trees of western larch, ponderosa pine, cottonwood, aspen, Douglas-fir, and western red cedar. The second choice would be the healthier trees of these species, considering that they would have the potential to become desirable snag habitat at some point in the future. See also the discussion on the live reserve tree retention guideline below and its interrelation with the snag retention standards.
- Though the live reserve tree guideline (FW-GDL-TE&V-09) would often lead to selecting different trees for retention than might be selected for snag replacements (i.e., healthy trees vs. decadent or decayed trees), in some situations live trees retained under FW-GDL-TE&V-09 might also be counted towards the live snag replacement standards. For example, when there are insufficient snags or live/decadent snag replacement trees in a timber harvest area, then the relatively healthy reserve trees left to meet FW-GDL-TE&V-09 might also be considered snag replacement trees.
- When selecting live snag replacement trees, especially in areas with few snags, consider the possibility of creating desirable snag habitat through topping or girdling trees. This may be combined with the collection of seed needed for future reforestation efforts. For example, western larch trees might be topped to remove cones, which might also facilitate decay and the development of desirable future snag habitat.
- If trees are diseased (i.e., mistletoe infected), consider girdling to create snags in the near future. Also, consider grouping reserve trees to keep infection from spreading across the entire harvest unit and consider planting non-susceptible species.

The analysis area for applying the standard

Evaluation of snag conditions and snag retention prescriptions will occur at the project level. The analysis unit for the minimum snag and live snag replacement tree densities could be the individual harvest unit, or across all harvest units, or across groups of units (e.g., grouped by potential vegetation type). In the case of salvage harvest after disturbances that have created very high snag levels across a landscape (i.e., due to fire, insects, or disease), the analysis unit across which snag standards would apply might be different because the snag conditions are substantially different. The overall intent of this analysis approach is to recognize that there is naturally very high variability in snag densities and distribution across the landscape. In fire, insect, or disease salvage projects, the intent is to determine the analysis unit for analyzing snags and snag habitat needs that is appropriate for the specific landscape conditions affected by the fire or other disturbance. The overall goal is to facilitate the retention of the most desirable snags, decadent trees, and replacement trees wherever they may exist.

Consider the following when determining the appropriate analysis unit for applying the snag retention standards:

- Where the minimum number of suitable snags or live replacement trees are not present within individual harvest units prior to management activities, use the flexibility provided in the determination of the appropriate analysis area over which to apply the standard. There may be more opportunity to achieve desired densities of snags and/or replacement trees, and provide desired snag

habitat, if all or some of the units are grouped for purposes of applying the minimum snag levels. Consider leaving alternative species or sizes of snags or live replacement trees, if available.

- When grouping units, consider potential vegetation type groupings and/or regeneration/non-regeneration groupings to ensure snags are distributed across the different sites and forest structural conditions. Also consider grouping lodgepole pine-dominated units.
- Harvest units where more than the minimum levels of desirable larger snags and decadent trees exist might have more than the minimum level of snags/decadent trees retained, which may compensate for units in the same project analysis area with few or no desirable larger snags/decadent trees.
- In timber harvest areas that are dominated by smaller diameter lodgepole pine, for example, there may be few or no suitable snags or live snag replacement trees. Consider leaving smaller trees of suitable species (such as less than 10 inches d.b.h. Douglas-fir) to provide some structural diversity and potential snag habitat. Patches of intact lodgepole pine could also be retained within harvest unit boundaries, particularly in large units, to provide structural diversity, wildlife cover, and at least some level of potential small-diameter snag habitat.
- In fire, insect, or disease salvage areas, where there are very high numbers of snags across the landscape, the appropriate analysis unit may be the burned area, the project area, or a watershed boundary that contains both burned and unburned forest. Consider the following factors when determining the appropriate analysis area for application of snag retention direction:
 - ♦ potential home range size of species that utilize the snag/downed wood components
 - ♦ the effects of fire, tree mortality, management, or other activities across the landscape and the differences between project alternatives
 - ♦ the ability of the habitat to support species associated with snags/downed wood and the distribution of such habitat across the landscape
 - ♦ known or suspected population sinks for species associated with snag/downed wood habitat in or near the area
 - ♦ the influence of potential firewood-cutting activities. For example, snags within 200 feet of an open road where firewood cutting is permitted have a high likelihood of ending up in a stack of firewood. The analysis area for developing and implementing the snag retention prescription could be adjusted to exclude these areas.

Forest pattern, patch sizes, connectivity

Desired condition FW-DC-TE&V-18 addresses desired forest patterns and patch sizes related to early successional seedling/sapling-dominated openings across the landscape. Analyses of the natural range of variation indicate a wide range in the size of early successional seedling/sapling forest patch sizes, which would be expected considering the predominance of moderate- and high-severity fire disturbance regimes (refer to Trechsel, 2017c for details on this analysis). The character of forest patches and patterns related to early successional forest openings changes relatively rapidly compared to mid- and later successional forest conditions. This is because seedling/sapling stands transition relatively quickly into mid-successional stands that have larger trees and dense forest canopies. This may occur 30 to 40 years after the disturbance that established the new forest. Stands can remain in this mid-successional, closed-canopy, densely forested condition for many decades or centuries if not altered by a stand-replacing disturbance. Both fire (prescribed and wildfire) and timber harvest are possible management tools for maintaining and creating the desired amount and distribution of young, early-successional forest patches.

Potential strategies

These strategies apply during project-level analysis, at both the landscape and stand level, to trend towards or maintain desired conditions for forest patterns and patch sizes and associated forest conditions (FW-DC-TE&V-02, 03, 18, 19; FW-DC-TIMB-01). The desired trend may be towards larger openings, which have less edge per unit area, which is desirable for wildlife species that avoid edge habitats or experience greater mortality near edge habitats. Or, it may be towards a mosaic of smaller openings dispersed across a forested area, which is desirable for species associated with more edge per unit area. Management strategies to create appropriate patch sizes, conditions within patches, and their distribution across the landscape could include the following:

- If creating large openings through vegetation treatments, retain additional forest structural components within the openings 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 or small groups of live trees distributed throughout the harvest openings, and it also could include retaining greater numbers of snags.
- Consider scenery in project design (FW-GDL-SCN-03). To lessen the visual impact, larger harvest openings can have irregular shapes that are blended into the natural terrain. Retention of individual trees or patches of trees within the openings would also create a more visually pleasing appearance. Incorporate the natural patterns that might be produced by a mixed-severity fire into the shape and size and design of openings. In this case, short-term negative visual impacts would lead to long-term benefits.
- Locate new harvest openings immediately adjacent to existing patches of sapling-size trees. This initially creates a larger patch of early successional forest where trees are of the same cohort (i.e., tree ages are within 20 years of each other) while lessening potential concerns related to larger openings.
- When determining where a larger opening might be created by a harvest unit, consider factors such as wildlife habitat connectivity, wildlife security (e.g., adjacency to open roads or viewpoints); visibility from areas with a high level of public use; desired conditions related to potential fire behavior and fuel loadings; watershed conditions related to water yields; ability of ungulates to move from place to place in winter; and the retention of larger areas of late-successional forest in the vicinity of larger openings.
- Consider desired conditions for the development of future late-successional and old-growth forest. Larger patches of young seedling/sapling forests, particularly when older forest structures are retained within the unit (such as large live reserve trees), can eventually develop into larger patches of old-growth or late-successional forest over time, which is a desired long-term condition for the ecosystem (FW-DC-TE&V-14 and FW-GDL-TE&V-06).

Managing forest pattern to provide wildlife habitat connectivity

As discussed in the EIS, wildlife habitat connectivity has many forms. This section addresses the connectivity of wildlife habitat provided by coniferous forests. Because the connectivity of coniferous forest changes over time due to a variety of processes (e.g., wildfire, insects, disease, timber harvest, prescribed fire), it is best assessed for vegetation management projects on a site-specific basis—at a project scale or at a 6th code hydrologic unit code watershed scale or larger. Analysis tools such as FRAGSTATS may be useful at the project level (McGarigal, 2013). Site-specific analysis of forested connectivity looks at connections provided by and between areas of forests to maintain connectivity for wildlife species associated with forest interior conditions. One possible strategy would be to retain patches of trees with an average d.b.h. of at least 5 inches that are shaped so that a portion of the patch is

more than 325 feet from an opening. This location can be determined by taking the forest patch that is greater than 5 inches average d.b.h. and using the GIS spatial buffer analysis tool to create an interior buffer of 325 feet while also paying special attention to providing forested connections from riparian management zones to ridgelines, through low saddles between watersheds, and also between old-growth forest patches.

An example of a project analysis using this strategy is displayed in figure c-4. In this example, timber harvest would be designed so patches providing coniferous forest cover (green and brown) between existing openings (yellow) are at least 650 feet wide. In addition, special consideration would be given to retaining late-successional forest (dark green) between and adjacent to patches of brown (old-growth forest) to increase the size of patches that have old-growth forest characteristics in the future and to provide for connectivity. Precommercial thinning of early-successional forest could promote the diameter growth of key tree species, if consistent with other standards.

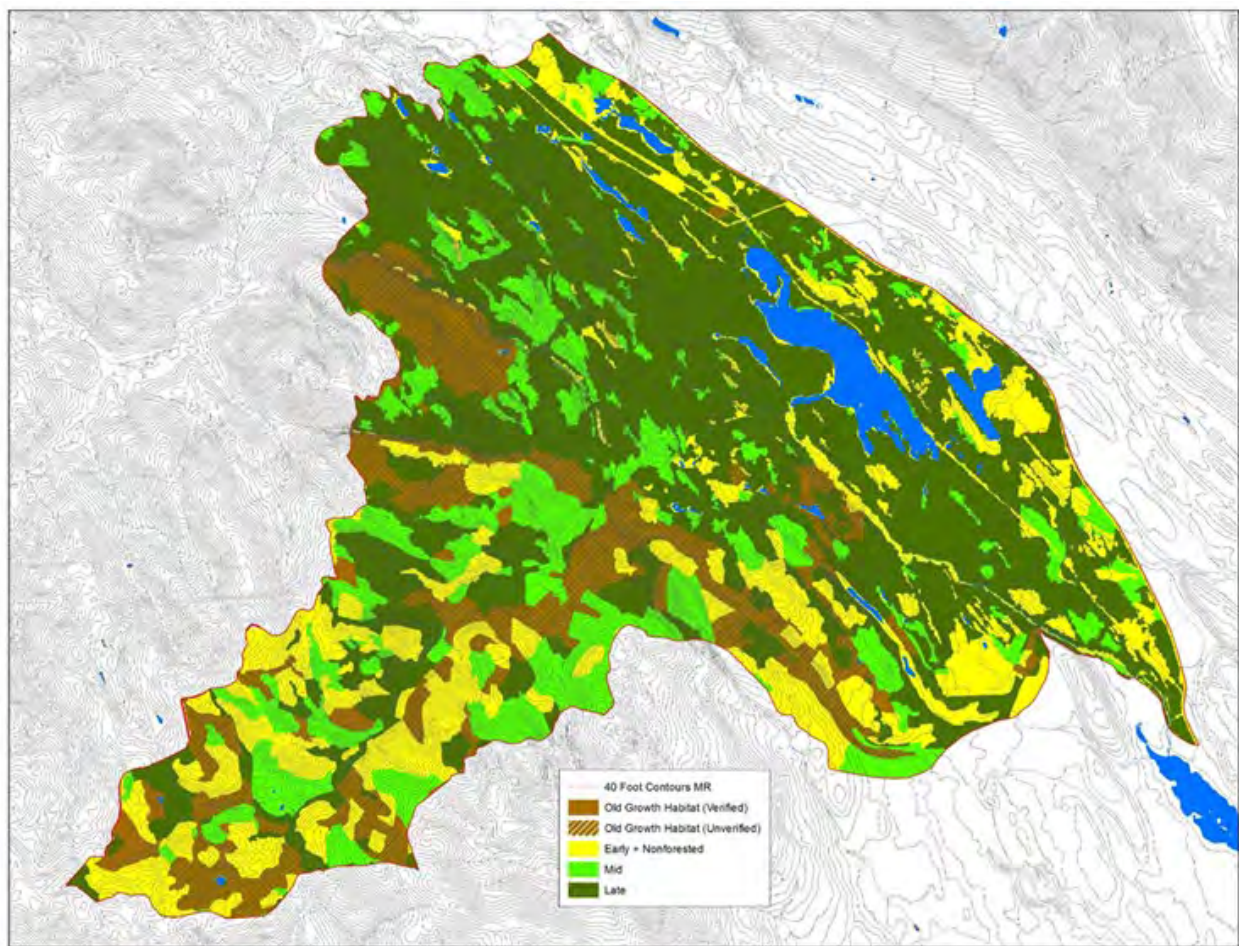


Figure C-4. Example of a pattern, patch size, and connectivity analysis

Another example (figure c-5) could apply to projects planned in portions of the Forest where sections of land under other ownerships have been recently regenerated. For example, the Swan Valley geographic area desired condition GA-SV-DC-06 directly addresses this situation. Forest Service harvest unit location and treatment prescriptions could consider the long-term desired condition to create more “natural” forest patterns, patch sizes, and shapes across the landscape, reducing the “checkerboard” pattern. Consideration

would be given to locating harvest units so that large blocks of mature forest habitat would be retained to provide for wildlife considerations such as snow intercept cover, habitat diversity, and connectivity. New, irregularly shaped harvest openings could be created adjacent to past harvest areas on other land ownerships as soon as they provide cover in order to eliminate the straight edge.



Figure C-5. Example of existing habitat pattern and patch size

Other possible management activities related to wildlife habitat connectivity include the following:

- Coordinate with other agencies or landowners to identify practices that facilitate wildlife movement and reduce mortality when highway or NFS road construction or reconstruction is proposed in linkage areas, using the best available scientific information. See, for example, Highway Mitigation for Wildlife in Northwest Montana (Ament et al., 2014).
- Emphasize key habitats such as riparian areas to maintain connectivity across all lands (Haber & Nelson, 2015).
- Protect and restore ecological connectivity as a leading climate adaptation strategy for biodiversity. Conservation and riparian areas are key targets for these efforts (Krosby, Norheim, & Theobald, 2015).

Recently burned forest conditions

The strategies described below are possible ways to maintain or trend towards desired condition FW-DC-TE&V-25 and to achieve guidelines FW-GDL-TIMB-02 and 03, which are related to recently burned forest conditions.

- When wildfires occur, use site-specific analysis to address desired conditions for salvaging dead trees for economic value, for management of future fire behavior, for social considerations such as spread of insects to adjacent private lands, and for desired ecological conditions.
- Assess the possibility of salvage harvest in burned forests in the landscape context. In many areas of the Forest, stand-replacing wildfires may kill trees over thousands or tens of thousands of acres. Evaluating the entire area within the burn perimeter to determine the percentage of each management area contained within it provides important information. For example, if a large percentage of the wildfire area is within management areas that cannot be accessed for salvage harvest, this might influence the amount of salvage harvest and/or the snag retention prescriptions that could occur within the management areas that are accessible.
- Consider the accessibility of the area for firewood gathering, for example the presence of system roads (either open or closed to the public) when determining where salvage may occur and where retention patches of burned forest may be left. Also consider and anticipate future potential for temporary access for firewood gathering.

Several wildlife species are associated with burned forests. FW-GDL-TIMB-02 and 03 emphasize the retention of patches of trees within wildfire areas to support these wildlife species. When developing potential strategies for implementing guideline FW-GDL-TIMB-03, first consider the landscape context described above. Because black-backed woodpeckers are one of the key species closely associated with intensively burned areas, possible strategies to meet their needs during salvage harvest are outlined below (see Wisdom et al., 2000). These possible strategies recognize that the use of burned areas by black-backed woodpeckers changes over time as they move from areas where trees have died immediately after fire to areas where trees die slowly after fire to unburned areas.

For new fires that burn more than 250 acres at moderate to high severity, retain a range of snag species, patterns, sizes, and conditions through approaches such as the following:

- Retain clumps of burned trees with at least 40 trees per acre, including both nest trees and trees with high densities of wood-boring beetles for feeding, because a lack of food sources near nest trees appears to be limiting to black-backed woodpecker populations. It is desirable for retention patches burned by fire to have a mean of 12 to 20 snags per acre greater than or equal to 10 inches d.b.h. In burn areas greater than 1,000 acres in size, consider retaining patches at least 100 acres in size that had at least 50 percent canopy cover prior to wildfire (this can be estimated using vegetation classifications such as VMap).
- Retain snags in the interior of the fire area, if possible, and in areas where snags are not susceptible to loss due to firewood cutting. If an area of burned forest is retained to provide habitat for black-backed woodpeckers, consider not allowing temporary access into these areas for firewood gathering for at least 10 years post-fire.
- Within snag retention areas, consider also leaving large and very large live trees that are scorched but perhaps not directly killed by the fire. These trees are important because they may die over a longer period of time, helping to maintain higher populations of species such as black-backed woodpeckers over time. They may also contribute to structural diversity and provide nest and perch trees for birds of prey and future habitat for many cavity-nesting species.

Non-coniferous plant communities

Potential strategies related to FW-DC-TE&V-09, for maintaining or increasing the presence of hardwood trees, and FW-OBJ-TE&V-03, for vegetation management treatments on 500 to 5,000 acres of forest to contribute to the restoration of diverse native hardwood forest types, are as follows:

- Retain as many hardwood trees as possible within harvest units.
- Remove understory conifers in aspen or cottonwood plant communities, using techniques such as daylight thinning or prescribed fire.
- Use root cutting, burning, or the cutting of hardwood trees less than 10 inches d.b.h. to promote suckering.
- Allow beavers to flood areas to maintain and regenerate hardwoods.
- If harvesting in riparian management zones, include prescription objectives that promote hardwood establishment, retention and development.
- Plant hardwood seedlings and/or stems.
- Retain enough coniferous forest adjacent to large cottonwood trees to reduce the risk of blowdown, “feathering” the edges of adjacent regeneration harvest units.
- Retain cottonwood trees in the largest size classes to provide nest sites for species such as pileated woodpeckers or colonies of great blue herons and to provide den sites for species such as black bears and fishers.

Potential strategies related to FW-DC-TE&V-09, for maintaining or increasing grass/forb/shrub communities, and FW-OBJ-TE&V-04, for vegetation management treatments on 1,500 to 5,000 acres to promote the persistence of grass/forb/shrub plant communities, focus on key habitats for big game species by improving conditions for native plant establishment and growth and reducing non-native plants. Possible actions, in cooperation with MFWP, counties, and non-government organizations, include the following:

- Apply timber harvest, thinning, and/or managing fire to create temporary grass/forb/shrub communities.
- Apply slashing and/or managing fire (i.e., prescribed fire and wildfire) to maintain persistent grass/forb/shrub openings and stimulate shrub sprouting.
- Treat invasive weeds with biological, chemical, or mechanical means, as appropriate.
- Revegetate disturbed sites with native grass/forb/shrub species.

Timber Harvest and Suitability for Timber Production

The National Forest Management Act directs Forests to identify lands that are not suited for timber production (16 U.S.C. 1600 Sec. 6). Lands *suitable for timber production*, lands *unsuitable for timber production but where timber harvest is allowable*, and lands *not suited* for either were determined for the forest plan, following direction within the 2012 planning rule (36 CFR § 219.11(a)) and handbook direction (Forest Service Handbook 1909.12, 61). Lands suitable for timber production are those lands where the purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for commercial use is determined to be appropriate, based upon compatibility with the desired conditions in the plan. They are lands where timber production is a desired primary or secondary use of the land and where a flow of timber can be planned and scheduled on a reasonably predictable basis.

Determination of lands unsuitable for timber production

The first step in determining lands unsuitable for timber production involved identifying lands not suited for timber production based on legal and technical factors. These included designated wilderness areas, inventoried roadless areas, non-forested lands (including road templates), and areas where site conditions are considered to have potential for irreversible damage or where restocking is not assured (such as areas of very low site productivity or areas with potential regeneration problems). Refer to table c-4 below. Available Flathead National Forest GIS layers (as noted in the table) were used to map the non-forested lands and sites considered technically unsuited for timber production.

Table C-4. Site categories of landtypes that are not included within lands on the Forest suitable for timber production

Site category	Description	Data sources
Landtypes 10-2, 10-3, 14-3	Wet alluvial deposits that include floodplains and moraine depressions with lakebed sediments. Sensitive attribute: Poorly drained, saturated conditions	Existing landtype layers in Forest GIS library
Landtype 12	Moraine depressions with lakebed sediments where wet meadow grasses, sedges, and shrubs grow. Sensitive attribute: Poorly drained, saturated conditions	Existing landtype layers in Forest GIS library
Landtype 17	Avalanche debris fields. Sensitive attribute: Steep and rocky, thin soils	Existing landtype layers in Forest GIS library
Landtype 54	High-elevation cirque basins, rocky land. Sensitive attribute: Steep and rocky, thin soils	Existing landtype layers in Forest GIS library
Landtype 55	Low- to mid-elevation rocky hillsides with sparse forest cover. Sensitive attribute: Rocky, thin soils	Existing landtype layers in Forest GIS library
Landtype 72	Steep, high-elevation cirque headwalls and ridges; rocky land, talus mosaic with soils. Sensitive attribute: Steep, rocky thin soils and short growing season	Existing landtype layers in Forest GIS library
Landtype 75	Rock cliffs and limestone areas with sparse forest cover. Sensitive attribute: Rocky, thin soils and alkali soil conditions that restrict growth	Existing landtype layers in Forest GIS library
Non-forested uses and vegetation types	Administrative sites, existing road templates, lands with less than 10 percent tree cover (persistent grass/forb/shrub lands; rocky lands; water)	VMap dominance types; R1 potential vegetation type layer (J. Jones, 2004)
Non-forested types	potential vegetation types: alpine larch, whitebark pine	R1 potential vegetation type layer (J. Jones, 2004)

The second step involved identifying lands where timber production is not compatible with the land area's desired conditions and objectives. This included removal of those lands within management areas 1b, 2a, 2b, 3a, 3b, 4a, 5a-d, 6a, the Coram Experimental Forest in management area 4b, and some of the management area 7 areas (such as the developed recreation sites). It also included removal of the lands (as mapped for the forest plan revision analysis) within the riparian management zones for streams, wetlands, and other water features, as defined in the forest plan FW-RMZ-STD-01.

Lands remaining after completion of these two steps are considered suitable for timber production. They include most of the lands within management areas 6b and 6c, the Miller Creek Demonstration Forest in management area 4b, and some of the management area 7 areas (see suitability for each management area 7 area in chapter 3 of the plan).

Under the suitability sections for each management area in chapter 3 of the forest plan, the timber suitability determination for the management area is stated. The introduction to the Forest Vegetation Products: Timber section in chapter 2 of the plan displays the acres of lands suitable and unsuitable for timber production. Appendix 2 in the final EIS, Trechsel (2015), and Ake (2015) describe in detail the process used to identify lands suitable for timber production. The Forest's GIS data library contains the timber suitability map created for the analyses conducted for the forest plan revision process.

Project-level planning and timber suitability determinations

It is important to note that within the boundaries of the management areas that are identified in chapter 3 of the plan as suitable for timber production (for example, within management areas 6b and 6c), there are inclusions of lands determined unsuitable for timber production for one or another of the reasons described in steps one and two above. Most are in one of two categories: riparian management zones or excluded landtypes (Table C-4). Lands unsuitable for timber production were mapped during the plan revision process for the purpose of programmatically assessing timber suitability and conducting the effects analysis of the plan alternatives, using broad-scale forestwide GIS layers and data sets. This map is located in the Forest's GIS data library. However, this map is at the programmatic level of resolution; it represents the preliminary screening of unsuitable lands. It is expected that the lands suitable or unsuitable for timber production will be confirmed at the project level where necessary, based on the site-specific factors that determine suitability for timber production as described in the section above (also refer to Trechsel, 2015). For example, if needed, the actual locating of streams and the determination of riparian management zones would be done at the project level, as well as the identification and fine-scale mapping of non-forested areas and lands that were excluded based on site and technical factors (table c-4). Corrections and changes to the Forest's GIS timber suitability data set may occur due to this site-specific evaluation and/or to address such factors as mapping, data, or technical errors. Depending on the magnitude of the change from the programmatic map developed for the forest plan revision, a site-specific amendment to the plan may be needed.

Lands unsuitable for timber production where timber harvest *is not* allowed

This determination applies to the following management areas: management area 1a (designated wilderness), management area 1b (recommended wilderness), and management areas 2a and 2b (wild segments of designated and eligible wild and scenic rivers). Though timber harvest is not allowed, other vegetation treatments may occur if they are consistent with management direction. For example, the following management activities are allowed on these lands:

- the use of fire, restricted to unplanned ignitions in management areas 1a and 2a and the limited application of planned ignitions in management areas 1b and 2b,
- weed treatments (methods used will vary), and
- treatments associated with whitebark pine restoration in management area 1b, such as research, collection of seed, thinning/fuel reduction (no tree removal from the site) adjacent to trees identified for research or operational cone collection, and planting of tree seedlings.

Lands unsuitable for timber production where timber harvest *is* allowed

Timber harvest is allowed on some lands that have been determined to be *not suitable* for timber production (see table 34 in the forest plan, and FW-DC-TIMB-06). This determination applies to the following management areas: management areas 2a and 2b (scenic and recreational segments of designated and eligible wild and scenic rivers); management areas 3a, 3b, 4a, 4b, 5a-5d, 6a, and some of

the management area 7 areas (such as the developed recreation sites). Timber harvest on these lands would have to be consistent with other management direction associated with the management area and other resources. Timber harvest on these lands is not scheduled or managed on a rotation basis but does contribute towards the projected sale quantity and projected wood sale quantity. Timber harvest and other vegetation treatments may also contribute towards achieving desired conditions associated with vegetation conditions, wildlife habitat, or for other resources. Only minor amounts of timber harvest are expected to occur on these lands (see table c-2).

The desired conditions that guide the purpose for harvesting in these areas will vary, depending on the management area designation and associated plan direction and other site-specific conditions. Desired ecological conditions that may form the basis for vegetation treatments include (but are not limited to) the following:

- FW-DC-TE&V-01, 02, 03, and 04 (resilient forests that would contribute to habitat needs of plants and animals)
- FW-DC-TE&V-08, 09, 10, 11, 12, 13, 14, and 19 (forest composition and structure that would contribute to ecosystem resilience)
- FW-DC-TE&V-21, 22, and 23 and FW-DC-FIRE- 03, 04, and 05 (desired role of fire on the landscape and its contribution to desired ecological conditions)

The purpose and need for harvest or other vegetation treatments based upon these and other resource desired conditions (such as those associated with recreational use or public safety) may include

- moving conditions towards desired stand or landscape vegetation composition, structure, and patterns, including restoration of ecosystem functions and improving resiliency;
- maintaining or enhancing wildlife habitat;
- improving the production of forage for wildlife;
- recovering economic value of dead/dying trees (salvage harvest is acceptable on lands that are unsuitable for timber production and is allowed under the National Forest Management Act);
- hazardous fuels reduction;
- forest insect or disease mitigation;
- performing research or administrative studies;
- addressing issues of public safety and health; and
- improvement of recreation, infrastructure, and/or scenic resource conditions, including the creation of scenic vistas.

Examples of project purposes and needs for harvest or other vegetation treatments within the management areas that are unsuitable for timber production but where timber harvest is allowed may include, but are not limited to, the following:

- management area 3a (administrative sites): Harvest and treatments will generally be conducted for purposes related to safety (i.e., salvage of dead trees); reducing fuels and fire hazard; and improving forest resilience to potential disturbances such as fire and insects.
- management area 3b (special areas): Treatments are done specifically to restore or enhance the terrestrial or aquatic resources associated with the special area. Possible management approaches may include

- ◆ the use of fire (planned or unplanned ignitions) to restore ecological processes and/or reduce tree densities or
- ◆ understory thinning to reduce forest densities and lower the risk of severe fire.
- management area 4a (research natural areas): Treatments are only allowed for study and research purposes and in situations where the values for which the research natural area were designated would be degraded or lost without management. Possible approaches could include
 - ◆ the use of fire (planned or unplanned ignitions) to restore or maintain natural ecological processes and vegetation conditions.
- management area 4b (Coram Experimental Forest): Timber harvesting and vegetation treatments for salvage logging, for research purposes, or to achieve desired vegetation conditions could occur, as mutually agreed upon between Rocky Mountain Research Station and the Forest. Possible treatments could include
 - ◆ regeneration or intermediate harvest to maintain desired forest densities, species, and growth;
 - ◆ regeneration or intermediate harvest to reduce forest fuels and fire hazard
 - ◆ the use of fire, usually prescribed fire, to achieve or maintain desired forest conditions; or
 - ◆ a variety of different vegetation treatments associated with research projects or studies.
- management areas 2a and 2b (scenic and recreational segments of designated and eligible wild and scenic rivers). Salvage harvest is allowed, as well as timber harvest/vegetation treatments to achieve desired vegetation conditions, as long as the outstandingly remarkable values associated with the segment are maintained.
- management areas 5a, 5b, 5c, and 5d (backcountry): Salvage harvest is allowed, and timber harvest/vegetation treatments that achieve desired vegetation conditions and are consistent with the recreational opportunities can occur (and consistent with the inventoried roadless area management direction where it occurs).
- certain management area 7 areas (developed recreation sites): Salvage harvest and timber harvest or vegetation treatments to achieve desired conditions associated with health and safety, scenic character, or other desired vegetation/recreation conditions are allowed.
- management area 6a (general forest low-intensity vegetation management): See discussion below on management areas 6a, 6b, and 6c.

Vegetation management in management areas 6a, 6b, and 6c (general forest areas)

General forest management areas are the regions of the Forest where active vegetation management activities are expected to play a dominant role in affecting vegetation conditions. Active vegetation management includes regeneration and intermediate harvest treatments (such as commercial thinning), salvage harvests, tree planting, noncommercial thinning, fuel reduction activities, cone collection, pruning, and prescribed fire. Management areas 6a, 6b and 6c are the areas of the Forest where the visible aspects of harvest and other treatments would likely be most evident when compared, for example, to management area 5 backcountry designations.

It is important to recognize that management areas 6a, 6b, and 6c are designations determined at the programmatic (forest plan) level of analysis. They are provided for the purpose of indicating where most tree harvest and other active vegetation management activities are expected to occur, as well as the

anticipated level of management intensity. Vegetation management intensity levels reflect such factors the proportion (in acres) of a project area that is treated under one project proposal, the frequency (how often) activities occur within a project area over time, and the type and proportion of treatments that may occur (for example, regeneration harvests vs commercial thinning).

The levels of vegetation management intensity are designed as a *relative* concept, not an absolute, and are to be interpreted *in the context of all other forest plan direction*. This means that the levels of low, moderate and high reflect a *comparison* between management areas 6a, 6b and 6c. It also means that all vegetation management activities that occur would be designed to be consistent with forest plan desired conditions, standards and guidelines for all other affected resources, such as water quality, wildlife habitat, and soils protection. In every situation all appropriate forest plan direction related to ecological, social, and economic considerations would be applied in designing treatments, no matter what the assigned management intensity. In addition, there may be project-level resource values and unique situations that would influence the treatments. It is the site-specific analysis at the project level that ultimately determines the actual locations and appropriate intensity of management. Therefore, because of the diversity in project-level conditions there may be areas within management area 6c, for example, that may end up being managed at a less intense level than areas in management area 6b, or vice versa, depending on project-level objectives and site-specific conditions.

The different intensity levels were developed to reflect the degree that other resource values and considerations are anticipated to influence the amount of harvest and other vegetation treatments, as described further below for each general forest management area. Also provided below are some generic examples that reflect the different management intensities.

Management area 6a (general forest low-intensity vegetation management)

Management area 6a is unsuitable for timber production because evaluation at the programmatic level indicated that there is likely to be a relatively high level of other resource considerations or site limitations that would influence the amount or rate of harvest and make it difficult to ensure the production of a consistent, regulated timber harvest level over time. For example, management area 6a may be within grizzly bear secure core, within high-use white-tailed deer winter habitat, in important wildlife habitat connectivity areas, in areas of low site productivity, in areas with especially high scenic values, and/or within inventoried roadless areas.

In management area 6a, timber harvest is allowed to achieve multiple-use objectives and achieving them may change over time due to site-specific events or conditions. For example, a desired condition for areas within management 6a may be to have interconnected, mature forest patches for connectivity. However, management area 6a areas may burn in a wildfire or experience high levels of mature tree mortality due to insect infestation and mature forest cover may be lacking. As a result, a project may be initiated to harvest dead trees and severely burned sites may be planted to speed the time it takes for interconnected, mature forest cover to be re-established. This salvage harvest is acceptable on lands that are unsuitable for timber production and is allowed under the National Forest Management Act. Inherent in salvage is the recovery of economic value, whether from blowdown, burned trees, or other mortality. In this example, the purpose and need for harvesting in management area 6a may be to move the forest towards achieving the same desired conditions as in management areas 6b or 6c (e.g. contributing to the local economy), but the management approach for moving towards desired conditions for habitat connectivity would be different than it would be if current conditions provided cover. If live tree cover was available, more live trees could be retained in or between harvest units to provide for wildlife habitat connectivity.

Another example would be in those areas within grizzly bear secure core that are designated as management area 6a. Forest plan direction includes timing restrictions and limitations on road

construction and use, in order to provide security for grizzly bear, as well as other wildlife. As a result, the amount of area that may be able to be harvested in one entry may be reduced, and/or the time between re-entry into an area for treatment may be increased, as compared to areas within management areas 6b or 6c.

A third example is the management area 6a area designated within the Trail Creek area in the upper North Fork Flathead River. It lies within an inventoried roadless area but is also within the wildland urban interface. Treatment of the forests may be needed to reduce fuels and fire hazard; however, restrictions on road access and the types of treatments allowed within roadless areas would limit vegetation management opportunities. It may be difficult to access some of the forest areas for harvest purposes, and there may be a need to leave more trees within treated areas, when compared to areas within management areas 6b or 6c.

Management areas 6b and 6c (general forest medium- and high-intensity vegetation management)

These management areas include the lands determined to be suitable for timber production. As described earlier, the difference between management areas 6b and 6c is related to the degree other resource considerations might be expected to influence the intensity and/or frequency of harvest and other treatments. Examples of possible differences in vegetation management that might occur between these management areas is discussed below.

Some management area 6b is designated in the primary conservation area and in the demographic recovery area for the grizzly bear. In these areas, there is a desire to provide diverse successional stages to provide grizzly bear foods, while maintaining more cover and a lower open motorized route density for connectivity, as compared to areas within management areas 6c. As a result, timber harvest may contribute to the local economy, and prescribed burning may be used to promote bear foods, but more trees may be retained within a project area and/or within individual harvest units, or roads may be closed to motorized use following project activities, to move towards desired conditions for the grizzly bear.

Another example is the management area 6b designated in ponderosa pine/Douglas-fir forests that provide important white-tailed deer winter habitat. Similar as described under management area 6a above, treatments in these areas may be desirable to reduce the dense Douglas-fir understory and midstory while retaining more of the largest ponderosa pine and Douglas-fir so that the canopy can provide snow interception. A combination of timber harvest and prescribed burning may occur to enhance forage production, while retaining patches of young trees to provide desired understory cover. In management area 6c the same types of treatments may occur, but since many 6c areas are in the wildland urban interface near homes, vegetation treatments may occur more frequently or there may be more emphasis on mechanical treatments to reduce the risk of fire spreading to private property, compared to management area 6b.

Vegetation management in management area 7 (focused recreation areas)

In focused recreation areas, recreational uses are expected to be a focus of management, especially by providing “frontcountry” areas that are readily accessible to people in local communities. Vegetation management, including timber harvest, is expected to occur within most of the management area 7 areas, with the expected vegetation management intensity (e.g., equivalency to general forest management areas 6a, 6b, or 6c) indicated under the descriptions for each in the forest plan, chapter 3. The vegetation management intensities for the larger management area 7 complex in the south portion of the North Fork geographic area are displayed in figure B-33. Examples of possible management approaches include the following:

- Vegetation management in a management area 7 area that is identified as a low vegetation management intensity (equivalent to management area 6a) could occur for purposes related closely to maintaining or improving the recreational aspects of the area, such as providing scenic vistas, increasing sight lines along trails, reducing the risk of trees falling and obstructing a trail, or influencing snow conditions in a designated Nordic or alpine ski area.
- Vegetation management in a management area 7 area identified as moderate or high vegetation management intensity (equivalent to management area 6b or 6c) could occur to achieve a variety of ecological, social, and economic desired conditions, depending on site-specific conditions, similar to what might be expected in lands allocated as management area 6b or 6c. Enhancement of the recreational experience and of the recreational aspects associated with the management area 7 areas could be addressed in the vegetation treatment prescription. An example would be designing treatments to provide vegetation screening or scenic vistas where appropriate.

Vegetation management in the wildland-urban interface

To address desired conditions related to reducing risk of high severity fire and protection of communities and community assets (FW-DC-FIRE-02), the wildland-urban interface is expected to have some areas where tree densities and forest fuels (e.g., downed wood) may be maintained at relatively low levels over the long term, as compared to potential densities and downed wood amounts that might develop under natural disturbance regimes and natural succession. Forest plan desired conditions address and acknowledge the desire and expectation for the lower tree densities in portions of the wildland-urban interface (FW-DC-TE&V-13 and FW-DC-FIRE-07). These low tree density conditions are not anticipated to occur across the entire wildland-urban interface, and considerations for other resources (such as wildlife habitat and connectivity, and timber production) would be expected to be integrated into project-level design and into the decision by the responsible official. Lower tree densities would not preclude achievement of other desired vegetation conditions, and may contribute to them, for example by promoting development of very large trees of desired species (FW-DC-TE&V-12).

If these areas are on lands suitable for timber production, maintaining very low densities of trees over the long term would typically not be optimal from the timber production perspective. However, this would not be inconsistent with plan direction, which recognizes that there are multiple resource objectives and desired conditions to be considered at all scales of management, from the stand to the landscape scale, and that project-specific conditions would determine the site-specific treatments that would be applied. Project proposals and stand-level treatments do not need to address all forestwide desired conditions, but they must not preclude the achievement of any desired conditions. Refer also to the discussion in the section above under Terrestrial Vegetation and Vegetation Treatments, Desired conditions-general information.

Maximum opening size for timber harvest

Background

The National Forest Management Act is the foundation for standard FW-STD-TIMB-07. The National Forest Management Act limits clearcutting and other even-aged harvest to situations where “(iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal” (16 U.S.C 1604(g)(3)(F)). The maximum opening size established under NFMA for Forest Service lands in the USDA Forest Service

Northern Region area is 40 acres (FSM 2400, Ch. 2471.1), with some exceptions, such as in cases of “natural catastrophic conditions.”

The 2012 planning rule (36 CFR § 219) and the associated guidance provided in Forest Service Handbook 1909.12, chapter 60, provide direction for the development of plan components related to timber production to ensure consistency with the Act. This direction includes specific requirements for the development of plan components associated with the size of created openings (Forest Service Handbook 1909.12 sec. 64.21). The 2012 planning rule states that the plan “must include standards limiting the maximum size for openings that may be cut in one harvest operation according to geographic areas, forest types or other suitable classifications.” Under NFMA and the planning rule, for the Flathead National Forest the size of opening may not exceed 40 acres (36 CFR § 219.11(d)(4)). However, 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)). In addition, the 2012 planning rule (and the National Forest Management Act) provides for openings that exceed maximum limits in cases of “natural catastrophic conditions, such as fire, insect and disease attack, or windstorm” (36 CFR § 219.11(d)(4)).

Plan components addressing harvest opening size limits have been developed for the forest plan that more appropriately reflect the landscape patterns created by natural disturbance processes and would help achieve desired ecological conditions.

Forest plan standards FW-STD-TIMB-07, 08, and 09

These standards address the 40-acre maximum opening size limit and provide exceptions, consistent with the regulations and as stated in the 2012 rule. The standard includes the particular conditions under which the larger maximum size exception is permitted, including listing the primary desired conditions the opening sizes would contribute to achieving, as required by the 2012 rule. Openings up to the maximum size associated with the exceptions do not need public review and USDA Forest Service regional office approval, per the 2012 planning rule.

In developing the forest plan, an analysis of the natural range of variability in early successional forest openings created by fire was conducted. A comparison to the current size of openings was also done. This information was integrated with other resource and social considerations to develop the desired maximum opening sizes for timber harvest (see Trechsel, 2017a for details). These considerations included the following:

- Warm-dry and warm-moist potential vegetation types: Maximum opening size is established to be near the lower end of the estimated natural range of variation because of the tendency of these sites to be located in the lower elevations and often in areas of intermingled ownership, nearer to homes/communities, of higher road concentrations, more easily accessible, and on big game winter range (warm-dry potential vegetation type). These factors tempered the establishment of a larger maximum opening size, though from an ecological standpoint larger opening sizes would be acceptable.
- Cool-moist potential vegetation type: The current conditions for mean opening size is near the estimated mean natural range of variation, due to openings created by recent fire events. The maximum opening size is placed at the lower end of the estimated natural range of variation. Most of the cool-moist potential vegetation type is located in areas unsuitable for timber production and where wildfire and prescribed fire, not harvest, is likely to play the more dominant role in the future in creating large openings.

- Cold potential vegetation type: Essentially all of the cold potential vegetation type is unsuitable for timber production. Harvest is expected to be a rare occurrence, and wildfire or prescribed fire is expected to be the dominant creator of openings. The maximum opening size for harvest units is established near the average size of the estimated natural range of variation, consistent with the Forest's best understanding of the mean sizes of patches that might be produced by fire.

Wildlife and Plant Species Associated with Terrestrial Habitats

The following subsections provide possible strategies for selected plant and wildlife species in this category (also see strategies identified under the Terrestrial Ecosystem and Vegetation Management, Fire Management, Watershed, Riparian Habitat, and Aquatic Species sections of this appendix). We recognize that the best available scientific information may change over the life of the plan and that potential habitat management and conservation strategies may change as a result.

Plants

Whitebark pine

Whitebark pine habitat is present in the high-elevation areas across the Flathead National Forest, which includes many, if not most, of the recommended wilderness areas. Whitebark pine is a key ecological component of high-elevation forests, contributing to sustaining ecosystem integrity. Whitebark pine contributes to habitat for wildlife species, scenic character, forest ecological resilience and health, maintenance of naturalness and natural processes, and helps trend forests towards the natural range of variability of forest composition and structure. Refer to section 3.5.1 of the final EIS, subsection "Whitebark pine," for details of the historical and existing conditions of whitebark pine.

Whitebark pine in recommended wilderness

Forest plan components in chapter 3, management area 1b, recommended wilderness, that would pertain to whitebark pine conditions and management include:

MA1b-DC-02: "Recommended wilderness areas are characterized by a natural environment where ecological processes such as natural succession, wildfire, avalanches, insects, and disease function with a limited amount of human influence"

MA1b-SUIT-03: "Recommended wilderness areas are suitable for restoration activities where the outcomes will protect the wilderness characteristics of the areas, as long as the ecological and social characteristics that provide the basis for wilderness recommendation are maintained and protected."

The intent of this direction is to continue to allow for activities associated with whitebark pine restoration to occur within recommended wilderness areas, where determined to be appropriate and supported by a project-level analysis. These activities may include prescribed burning, planting and thinning of whitebark pine, insect and disease protection measures, fuel reduction around cone-collection trees, caging cones, and collection of seed and scion within recommended wilderness areas. Site-specific environmental assessment and analysis would occur prior to applying activities related to the restoration of whitebark pine.

Possible approaches to planning, analysis and implementation of whitebark pine restoration within recommended wilderness areas include the following:

- Conduct a minimum requirements analysis, with guidance provided by Minimum Requirements Decision Guide (Arthur Carhart National Wilderness Training Center, 2009) and the supplement

Evaluation Framework for Proposed Ecological Intervention in Wilderness (Aldo Leopold Wilderness Research Institute, 2016). These are intended as support tools to inform wilderness stewardship related to ecological intervention and restoration in wilderness, but the concepts may be applied to recommended wilderness as well.

- Use the most recent guidance or documents to provide additional information and support for restoration activities within recommended and designed wilderness areas. Currently, these include the publication “A Range-Wide Restoration Strategy for Whitebark Pine” (R. E. Keane et al., 2012).

In all management areas, FW-STD-TE&V-02 applies. To implement this standard, a field determination is made at the project level as to whether a forest stand containing mature whitebark pine has a dense understory that provides snowshoe hare habitat. If so, exception #4 to standard VEG S6 or exception #6 to standard VEG S5 (or both) allow for treatments to restore whitebark pine. If trees larger than sapling size are to be removed around whitebark pine trees, exception #4 to VEG S6 allows for noncommercial felling of trees larger than sapling size within 200 feet of whitebark pine trees (in stands that contain trees identified for cone, scion, or pollen collection) to make whitebark pine more likely to survive wildfires, more resistant to mountain pine beetle attack, and more likely to persist in future environments. If a forest stand does not provide snowshoe hare habitat, treatments may occur beyond the 200-foot distance around the whitebark pine trees. For example, if mature whitebark pine is growing on a more open south-facing slope or ridgeline, an appropriate strategy might be to use prescribed burning over a larger area.

Plant species of conservation concern

The regional forester is responsible for identifying species of conservation concern for forest plans developed under the 2012 planning rule. The most recent list of species of conservation concern is located at the following site: <https://www.fs.usda.gov/detail/r1/landmanagement/planning/?cid=fseprd500402>.

The planning rule and directives provide the opportunity to add or remove species of conservation concern for a Forest in the future, if determined appropriate based on new science or information and supporting analysis. The following are possible management strategies to use when designing projects that have the potential to affect plant species of conservation concern:

- Conduct surveys to identify potential new populations of species of conservation concern.
- Identify documented populations of plant species of conservation concern and their habitat early in the project planning process. Incorporate measures that protect plant populations or restore habitat conditions, if needed. For example:
 - ♦ FW-DC-NNIP-01 and FW-OBJ-NNIP-01 address impacts associated with invasive plant species, with areas around known populations of plant species of conservation concern noted as a high priority for treatment of invasive plants.
 - ♦ FW-GDL-PLANT DIV-02 states that heavy, ground-based equipment should not be used in areas with known plant species of conservation concern populations to reduce the potential for adverse impacts to plant species of conservation concern. This could be accomplished using some of the same measures identified in the Soils section above or might include incorporating project activity timing considerations to maintain occurrences or sustain habitats of plant species of conservation concern.

Other plant species

There may be species or plant communities that are not federally listed and do not meet the criteria to be a species of conservation concern but are of local interest for a variety of reasons. These reasons include key importance to wildlife habitat, recreation, spiritual or cultural values, or ecosystem integrity or their being listed by another agency in the plan area (such as Montana Natural Heritage Program

species of concern). Additional plants of interest are those that may qualify as a species of conservation concern in the future but for which information is currently lacking. During project-level analysis, consider potential impacts and protection measures for other plants of local interest that are not federally listed or identified as a species of conservation concern.

Wildlife

The following subsections describe potential management strategies and possible actions, at both the landscape and stand level, for plan components related to terrestrial wildlife. These strategies and actions are intended to 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 (changeable, augmentable, or replaceable) so as to be responsive to the results of new research, practical experience, and monitoring.

Canada lynx habitat and/or critical habitat

This section provides possible strategies for FW-DC-TE&V-19, FW-DC-WL-05, and appendix A (Northern Rockies Lynx Management Direction) standards ALL S1, VEG O2, VEG O4, VEG S5, and VEG S6.

To implement lynx management direction in appendix A, modeled lynx habitat is verified at the project level. The physical and biological conditions providing for Canada lynx are deep, fluffy snow and boreal forest potential vegetation types, as well as adjacent grand fir habitat types that provide habitat for snowshoe hares. A field determination is made as to whether the potential vegetation type for a proposed treatment area has the capability to provide lynx habitat. For example, warm-dry Douglas-fir/ponderosa pine habitat types are not lynx habitat (Squires et al., 2013). The existing condition of Canada lynx habitat or critical habitat changes over time as a result of fire, insect and disease, forest succession, timber harvest, and other vegetation management techniques that create a mosaic of structural stages and species compositions.

In modeled Canada lynx habitat, the desired condition for each lynx analysis unit is to have interconnected areas of mature multistory forests with Engelmann spruce and subalpine fir trees exceeding 1,000 stems per acre in the understory (less than 4 inches d.b.h.), with a minimum 280 stems per acre in the midstory and overstory (greater than 4 inches d.b.h.) (Squires, Decesare, Kolbe, & Ruggiero, 2010). Young forests with extremely high densities (e.g., greater than 14,000 stems per acre) occur following wildfires, but these would be interspersed in a mosaic with stands of much lower densities that are developing a multistoried stand structure. Downed trees provide sites for denning. Branches of live trees and shrubs touch the snow surface in winter to provide food and cover for snowshoe hares. Where conditions allow, a habitat mosaic that includes long, linear patches of interconnected mature forest adjacent to dense young forests is desirable. Riparian management zones would be anticipated to provide long, linear patches of mature forest and habitat connectivity, with openings that do not exceed 350 feet to cover (FW-GDL-RMZ-09), consistent with the findings of Squires and others (2013).

Vegetation management in lynx habitat

Treatments within stands in lynx habitat are determined by site-specific analysis of potential vegetation types and current vegetation conditions at the stand and lynx analysis unit scales, in the context of the Forest scale, as detailed in section 3.7.5 in the final EIS. Standard VEG S6 applies to multistory mature or late-successional forests providing snowshoe hare and lynx habitat, whereas VEG S5 applies to snowshoe hare and lynx habitat in the stand initiation structural stage.

As is consistent with the natural range of variation, some forested stands provide lynx habitat in a suitable condition (see the Northern Rockies Lynx Management Direction glossary in appendix A) at any given point in time, and some do not. Lynx habitat may be in a temporarily unsuitable condition due to processes such as wildfire, insect or disease infestation, timber harvest, thinning, or prescribed burning.

Treatments in stands that are not in stand initiation structural stage

Possible strategies for vegetation management activities, such as thinning, timber harvest, and prescribed burning, could have an intent of developing desirable lynx habitat conditions in areas where it is currently lacking. For example, in stands that do not currently have dense understory conditions that provide snowshoe hare habitat but have the potential to provide such habitat, possible approaches to treatments include the following:

- Use prescriptions for regeneration harvest, group selection, or intermediate harvest methods to treat forests in the stem exclusion structural stage to promote development of desirable forage for hares (see table c-5), to increase understory tree stem density for cover, and to increase the quality of snowshoe hare habitat.

Table C-5. Food plants used by snowshoe hares in the Western Rockies, Cascades, and Intermountain West (ILBT, 2013, table 2.1)

Conifers	Shrubs	References ¹ (Area Studied)
<i>Abies lasiocarpa</i>	<i>Amelanchier alnifolia</i>	Adams 1959 (Montana)
<i>Abies grandis</i>	<i>Arctostaphylos uva-ursi</i>	Koehler 1990a (Washington)
<i>Larix occidentalis</i>	<i>Ceanothus</i> spp.	Radwan & Campbell 1968 (Washington)
<i>Picea engelmannii</i>	<i>Juniperus scopulorum</i>	Thomas et al. 1997 (Washington)
<i>Pinus contorta</i>	<i>Mahonia repens</i>	Sullivan and Sullivan 1983 (British Columbia)
<i>Pinus monticola</i>	<i>Paxistima myrsinites</i>	Borrecco 1976 (Washington)
	<i>Pteridium aquilinum</i>	Black 1965 (Oregon)
<i>Pinus ponderosa</i>	<i>Rosa</i> spp.	Wirsing and Murray 2002 (Idaho)
<i>Pseudotsuga menziesii</i>	<i>Rubus</i> spp.	Zahratka 2004 (Colorado)
<i>Thuja plicata</i>	<i>Salix coulteri</i>	Zimmer 2004 (Montana)
<i>Tsuga heterophylla</i>	<i>Shepherdia canadensis</i> <i>Spirea betulifolia</i> <i>Symphoricarpos albus</i> <i>Vaccinium</i> spp.	Ellsworth and Reynolds 2006 (Rocky Mountains)

Note. To identify the references listed in this column, see the references section of the Canada Lynx Conservation Assessment and Strategy (ILBT, 2013).

- To respond to standard ALL S1, use vegetation management prescriptions in lynx habitat to address retention of cover within riparian management zones, following guideline FW-GDL-RMZ-09, and retention of cover from riparian management zones to low saddles between watersheds. Assess the current vegetation condition and distribution of NFS lands to determine where it would be feasible to provide cover across valleys between mountain ranges.

Treatments in stands in the stand initiation structural stage

A large amount of area burned with high severity wildfires on the Flathead during the decade 2000 to 2010. The resulting vegetation conditions and patterns suggests that a continued adaptive management strategy is desirable to promote lynx habitat conditions that are more sustainable in the face of expected

future climates and disturbance processes. Standard VEG S5 (see appendix A) limits precommercial thinning activities in snowshoe hare and lynx habitat in the stand initiation structural stage outside the wildland-urban interface. However, exceptions (2) and (3) under this standard (refer to appendix A of the plan) may be applicable under certain circumstances, such as if treatment proposals are supported by the best available scientific information and if they are approved at the regional level of the Forest Service and the State level of the USFWS. The following are possible strategies and approaches to management of stands in the stand initiation structural stage that might benefit Canada lynx and snowshoe hares:

- Apply precommercial thinning using modified methods (see discussion later) to promote development of future multistoried winter snowshoe hare habitat in lynx analysis units where it is lacking. For example, where stands that have regenerated from wildfire are extremely dense (14,000-50,000 stems per acre), or where there is an abundance of early stand initiation forest resulting from large areas burning at one time, thinning in some areas may allow new young trees to establish and/or more rapid growth of existing understory trees of species, such as Engelmann spruce, subalpine fir, and Douglas-fir. This would facilitate development of multistory forest structures and desirable lynx habitat conditions in the future.
- Use precommercial thinning to promote development of forest structures that are more resilient to future disturbances. For example, thinning could preferentially select for leave tree species that are long-lived and fire-resistant (such as western larch), and promote the more rapid growth of these trees in the larger size classes. Increased forest and landscape resilience would both meet desired conditions with respect to fire behavior and reduce risk of loss of the remaining areas of mature multistory hare and lynx habitat to wildfire.
- Base the location, amount, and type of precommercial thinning treatments upon an analysis of vegetation conditions at the scale of one or multiple lynx analysis units, and guided by the best available scientific information and appropriate consultation with the USFWS.
- Examples of two possible strategies associated with precommercial thinning in lynx habitat are using a patch cut technique or a modified thinning technique, as described below:
 - ♦ **Patch cut technique:** As studied by Bull and others (Bull, Heater, Clark, Shepherd, & Blumton, 2005), these techniques may be used in dense lodgepole pine stands. Bull and others evaluated a variety of precommercial thinning treatments using telemetry locations from 87 snowshoe hares within lodgepole pine stands located in northeast Oregon. The highest hare use of the five treatments and the unthinned forest control was a technique Bull called “patch cuts,” in which small circular patches (10 meters, or 33 feet) of trees were thinned within a larger area of unthinned forest (at least 33–165 feet wide). This design is shown in figure c-6. Bull stated, “Of the thinning treatments, the highest numbers of trapped hares and the smallest home ranges occurred in the patch cuts, whereas traditional methods of precommercial thinning lodgepole pine (recent thinning and old thinning) resulted in lowest numbers of snowshoe hares” (p. 12), similar to findings of other researchers. Bull summarized a 2000 study by Hodges, stating that hare numbers in patch cuts are characteristic of peak densities found in southern montane forests and that hare densities found in the other treatments tested were lower than these. Snowshoe hare home ranges reported in this study were similar to the 12.4-28.8-acre home range size reported by numerous other studies (Bull et al., 2005). Bull also found that cover provided by vegetation and coarse woody debris within 1 meter (3.3 feet) of the ground appeared to be important for hares. Slash from the patch and corridor cuts provided both forage and dense hiding cover for a year after treatment. Coarse woody debris provided hiding cover at more than half the rest sites in summer and created under-snow habitat at many of the rest sites in winter.

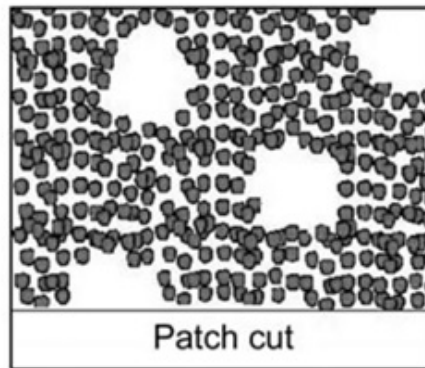


Figure C-6. Diagram of the Bull et al. (2005) patch thinning technique

- ♦ **Modified thinning technique:** This technique may be used in areas where early stand initiation forests are especially abundant, typically due to stand-replacing wildfire, and there may be a desire to develop more diverse forest structures and compositions both in the short and in the long term. One of the purposes for thinning would be to provide the kind of mature habitat snowshoe hares and lynx need over the long term that would not likely develop as rapidly (or at all) without thinning. For example, current sapling tree densities are very high within many areas that have recently burned on the Forest, which severely limits the regeneration and growth of shade-tolerant tree species in the understory canopy layers. Vegetation management strategies could be used to promote future mature multistory hare habitat, especially in areas where such hare habitat is lacking. Modified thinning techniques in young (seedling/sapling) stands, which change the future forest structure and composition in ways that create winter snowshoe hare and lynx habitat, could be conducted under VEG S5 exception #2 and/or exception #3, with appropriate consultation. A prescription for a modified thinning may include the following:

Where Engelmann spruce and subalpine fir are mixed with shade-intolerant species such as western larch, Douglas-fir, and/or white pine, thin the taller trees (typically shade-intolerant species) to 15 feet or more average spacing and leave the shorter trees (typically shade-tolerant species, such as subalpine fir and Engelmann spruce) unthinned. One way to implement this prescription is to require all trees below a certain height, such as 6 feet, to be retained, thinning only the tree layer that is over 6 feet tall. This method could promote more rapid development of the stand into a mature multistoried forest that can provide winter snowshoe hare and lynx habitat in the long term, and it would also develop an upper canopy of western larch, western white pine and/or Douglas-fir that has improved ability to survive wildfire due to faster growth in diameter. Because these species are adapted to surviving fire if they reach a large enough size between fire event (as opposed to subalpine fir and Engelmann spruce, which are readily killed by even the lower severity fires), this strategy could be used to help maintain greater forest structural and species diversity over time across a landscape, even if wildfires become more frequent. If species such as western larch are able to grow to large sizes and survive repeated fires, they can provide key habitat for a wide variety of bird species, including primary excavators that make cavities for some species of conservation concern.

Figure C-7 and figure c-8 show examples of simulated changes in structure and composition over time, using the Forest Vegetation Simulator. This model uses statistically reliable stand data collected in the field. Using this tool, the Forest has simulated the effects of “traditional” thinning

techniques (Figure C-7) and “modified” thinning techniques (Figure C-8), where stands are thinned with the intent of specifically improving forest composition and structure to provide the kind of mature habitat snowshoe hares and lynx need over the over the long term.

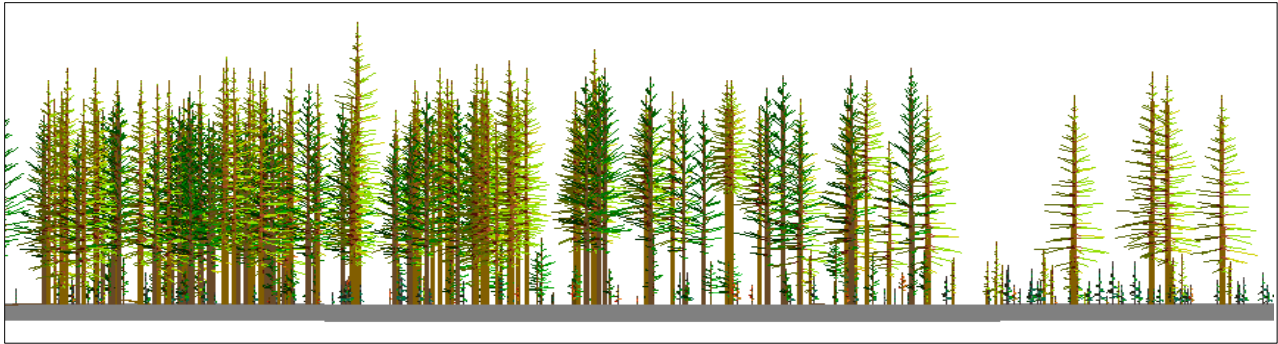


Figure C-7. A 30 year old forest stand that had “traditional” precommercial thinning 20 years after harvest, depicted about 10 years after thinning. Trees were thinned to an average of 300 trees per acre, with a cut height of 2 feet (e.g. trees under 2 foot in height were not cut); a dense understory that provides hare habitat is not present.

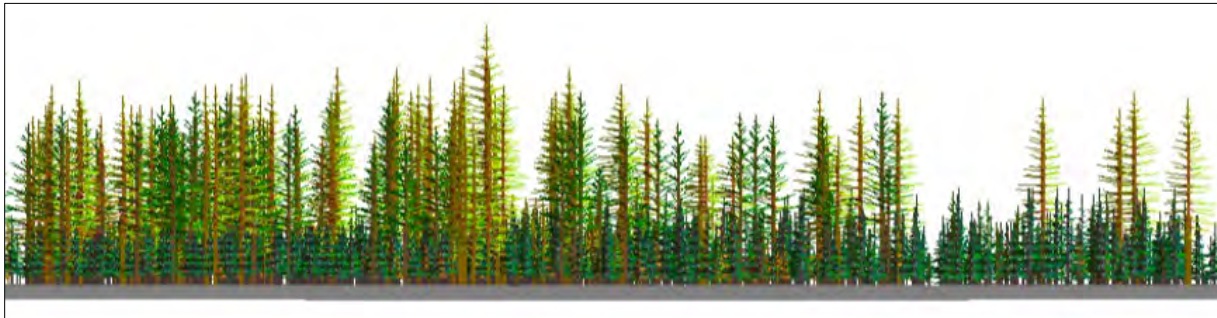


Figure C-8. A 30 year old forest stand that had “modified” precommercial thinning 20 years after harvest, depicted about 10 years after thinning. Trees were thinned to an average of 300 trees per acre, with a cut height 6 feet (e.g., trees under 6 foot tall were not cut – these are mainly more shade tolerant spruce and subalpine fir); a dense understory providing hare habitat is developing.

- Another strategy that might benefit Canada lynx and snowshoe hare is to include salvage harvest in areas that do not have a dense live understory providing snowshoe hare habitat (e.g., stands of mature lodgepole pine trees that have been killed by mountain pine beetle or stands where trees have been killed by stand-replacing wildfire). Salvage harvest (which may also be followed by planting particular tree species to meet desired conditions for diversity and future forest resilience) may shorten the time it takes for a dense understory that provides snowshoe hare habitat to develop. This can be determined at the project level using tools such as the Forest Vegetation Simulator to “grow” a forest into the future, and selection of treatments that make progress towards desired conditions for lynx and other species, based upon the best available scientific information. Guideline FW-GDL-TIMB-01 specifies retention of areas that are unburned or burned with low severity within wildfire areas. Observation of lynx telemetry locations on the Forest, as well as recent lynx research in Washington, indicates that retaining heterogeneity in wildfire areas, including patches that are unburned or burned with low severity, is important in providing for lynx use of post-fire areas (Vanbianchi, Murphy, & Hodges, 2017).

Grizzly bear habitat

This section provides strategies that apply to the primary conservation area for grizzly bears and are relevant to FW-DC-TE&V-01, 02, 04, 11, and 19, FW-DC-WL-02, and FW-GDL-TE&V-01 to 03.

Possible approaches and examples of management strategies include the following:

- Restrict vegetation and fuels management activities in time and space to reduce the potential for adverse disturbance or displacement of grizzly bears, as determined by a project-specific environmental analysis. For example, activities along main open roads may not disturb or displace grizzly bears because grizzlies may already be habituated to high levels of human activity in these areas. However, where grizzly bears are not accustomed to high levels of human activity, complete activities during the denning period, if feasible. If it is not feasible to complete activities during the denning time period, restrict operations in time and space to reduce significant disruptions of normal or expected grizzly activities. For example, restrict logging during the spring to favor the needs of grizzly bears during a key time period when snow at upper elevations reduces the availability of foraging habitat (typically April-June, but this varies due to elevation and snow melt conditions). In summer, when abundant habitat is available to grizzlies, operations such as timber harvests may not have timing restrictions but are subject to standard FW-STD-IFS-03 for temporary increases in motorized access due to projects (see glossary).
- Complete forest management activities such as precommercial thinning, burning, weed spraying, and road best management practices during the spring time period in order to meet objectives (especially if needed to prevent resource damage), but otherwise restrict these activities in time or space. For example, limit springtime activities to only one portion of a bear management subunit before moving to the next portion. To meet the desired condition for water quality and/or fish, removal or upsizing of culverts might need to occur in summer, even in secure core habitat, but could be restricted to a time period of 30 days or less. These activities generally cannot be conducted in winter, but it is best to limit the time it takes to complete them to reduce the risk of disturbance to grizzly bears.
- Apply silvicultural treatments in forested cover to provide a mosaic of all successional stages over the long term, with a variety of stand structures and species compositions. Monitor vegetation conditions such as size class to measure progress towards this desired condition. Group selection cuts and irregularly shaped regeneration harvests, in which prescribed fire slash removal is used to mimic wildfire, are desirable for creating high grizzly-food-producing openings in some stand types and habitat types. In appropriate locations and habitat types, vegetation management activities can increase the light available for berry-producing shrubs that bears use for food, increasing the production of berries (also see the Special Forest Products strategy section in this appendix). Examples of berry-producing shrubs include huckleberries (*Vaccinium globulare*, *Vaccinium membranaceum*), serviceberries (*Amelanchier alnifolia*), mountain ash (*Sorbus scopulina*), and buffaloberry (*Shepherdia Canadensis*). Simonin (2000) provides a wealth of information on *Vaccinium* species, their response to fire, and management considerations. Grizzly bear habitat enhancement through vegetation management is not recommended in or next to campgrounds or other developed sites frequented by people because this might increase the risk of grizzly bear-human conflicts.
- Where there is an intent to promote growth of grizzly bear foods, desirable regeneration harvest and slash disposal methods may include options such as the following:
- Minimize the distance to cover, such as by designing oblong or irregularly shaped harvest units or retaining one or more leave patches in units larger than 10 acres (if they will not be broadcast burned).

- Minimize soil scarification in habitat types in which soil disturbance impedes the reestablishment of grizzly foods (consistent with management plans).
- Dispose of slash by broadcast burning or whole-tree yarding to maintain or improve foods for grizzly bear in suitable habitat types and terrain.
- Protect hydric stream bottoms, wet meadows, marshes, and bogs from soil disturbance.
- Use sale area improvement timber sale receipts, collected for post-sale area improvement (e.g., Knudsen-Vandenberg Act and other funds collected under stewardship contract projects), when practical, to enhance or restore the quality of the grizzly habitat. Timber harvest unit layout may be designed to maintain cover along meadows and other open feeding sites, riparian areas, past harvest units that do not yet provide hiding cover, or known travel corridors, as specified in a site-specific environmental assessment. Sometimes cover is maintained by natural topography, and sometimes unthinned strips or patches may need to be retained within or adjacent to harvest units and precommercial thinning units, if needed.

When implementing FW-STD-IFS-03, include calculations of the annual estimated changes in open motorized route density, total motorized route density, and secure core for the anticipated duration of the project in National Environmental Policy Act analyses of projects (see glossary for definition of “project in grizzly bear habitat in the NCDE”). For projects involving helicopter use, see Anderson (2009). Incorporate the calculations for all projects under analysis in a grizzly bear subunit into the 10-year running average. Standard FW-STD-IFS-03 must be met, but there is some project-specific flexibility in how it is met. Two hypothetical examples are provided below in table c-6 and table c-7 that show how temporary changes in open motorized route density, total motorized route density, and secure core could be implemented for a project.

Temporary increase for projects: Hypothetical example #1

Example illustrated in Table C-6: According to standard FW-STD-IFS-03, the 10-year running average for open motorized route density is allowed to increase by 5 percent. In the table c-6 example, it increases from 19 to 31 percent (12 percent net) for four years, or a 10-year running average of 4.8 percent (48 percent divided by 10), so the standard is met. The 10-year running average for total motorized route density is allowed to increase by 3 percent. In the table c-7 example, it increases from 19 to 22 percent (3 percent net) for four years, or a 10-year running average of 1.2 percent (12 percent divided by 10), so the standard is met. The 10-year average for secure core is allowed to decrease by 2 percent. In this example, the net decrease in secure core is 5 percent per year for 4 years, or a 10-year running average of 2 percent (20 percent divided by 10), so the standard is met. In this hypothetical example of a 4-year project, the 10-year running average for core has reached the limit of 2 percent, so another project in this subunit would not be possible during the non-denning season unless that project complied with administrative use levels for open motorized route density, total motorized route density, and secure core.

Temporary increase for projects: Hypothetical example #2

Example illustrated in Table C-7: Open motorized route density increases from 17 to 22 percent (5 percent net) for 5 years, or a 10-year running average of 2.5 percent (25 percent divided by 10), so the standard is met. In the Table C-7 example, total motorized route density does not increase, so the standard is met. In this example, the net decrease in secure core is 2 percent per year for 5 years, or a 10-year running average of 1 percent (10 percent divided by 10), so the standard is met. In this hypothetical example of a 5-year project, none of the 10-year running averages have reached their respective limits of 5, 3, or 2 percent.

Table C-6. Changes in values in a bear management subunit for open motorized route density, total motorized route density, and secure core for project in years 7 through 10

Variable	Baseline Value	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
OMRD ^a	19	19	19	19	19	19	19	31	31	31	31
TMRD ^b	19	19	19	19	19	19	19	22	22	22	22
Secure Core	68	68	68	68	68	68	68	63	63	63	63
Net change	–	0	0	0	0	0	0	+12% OMRD +3% TMRD –5% core	+12% OMRD +3% TMRD –5% core	+12% OMRD +3% TMRD –5% core	+12% OMRD +3% TMRD –5% core

a. OMRD = open motorized route density

b. TMRD = total motorized route density

Table C-7. Changes in values in a bear management subunit for open motorized route density, total motorized route density, and secure core for project in years 5 through 10

Variable	Baseline Value	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
OMRD ^a	17	17	17	17	17	17	22	22	22	22	22
TMRD ^b	18	18	18	18	18	18	18	18	18	18	18
Secure Core	60	60	60	60	60	60	58	58	58	58	58
Net change	–	0	0	0	0	0	+5% OMRD +0% TMRD –2% core	+5% OMRD +0% TMRD –2% core	+5% OMRD +0% TMRD –2% core	+5% OMRD +0% TMRD –2% core	+5% OMRD +0% TMRD –2% core

a. OMRD = open motorized route density

b. TMRD = total motorized route density

Fisher

Available information on fisher habitat is from studies conducted in regions of North America other than northwest Montana, where the climate, soils, and habitat types are capable of producing large areas with conditions the fisher needs. In comparison, the habitat capability of the Flathead National Forest is believed to be marginal for fisher. On the Flathead National Forest, fisher habitat was modeled based upon Olson and others (2014). Olson modeled habitat based upon known locations of fisher in Idaho, where fisher home ranges are 12,355 to 24,710 acres in size. In contrast to north and central Idaho, there are very few areas on the Forest with that amount of modeled fisher habitat in contiguous blocks because of inherent limitations of topography, climate, soils, stand-replacing wildfire, and intermingled land ownership at lower elevations. On the Forest, potential habitat occurs in the portion of the warm-moist potential vegetation type composed of very large western red cedar, western hemlock, western larch, western white pine, Douglas-fir, and grand-fir mixed with other size classes. Contiguous blocks of this potential vegetation type occur in portions of the Swan Valley geographic area, the Salish Mountains geographic area, and the southern end of the North Fork geographic area but are lacking elsewhere (see figures B-3 through B-9 in the forest plan). Where there are warm-moist potential vegetation types with the potential to provide fisher habitat, the following potential management approaches could be considered at the project level. These considerations are most appropriately applied on a site-specific basis because scientific information on fisher habitat in Montana is developing and the existing condition of complex landscape patterns needs to be assessed to meet the desired conditions for fisher habitat.

The first step in a possible management strategy is to assess a project area and surrounding NFS lands to determine whether there is a potential home range of about 12,355 to 24,710 acres. If a potential home range exists, the next steps in a potential strategy would be as follows:

- Identify the forest stands that provide old-growth forest, assess their patch size and connectivity, and incorporate this information into locations of and prescriptions for treatments. These steps provide information to address plan components FW-DC-WL DIV-01, FW-STD-TE&V-01, and FW-GDL-TE&V-06.
- Using tools such as VMap and GIS data, analyze the potential fisher home range to see if it provides a combined amount of 50 percent mature and old-growth forest arranged in connected, complex shapes with few isolated patches.
- In areas proposed for vegetation management, determine prescriptions to create a mosaic of successional stages, promote development of very large live trees, and retain very large defective live trees, snags, and downed wood to contribute to the complex structure that provides high-quality fisher habitat. This provides information to address plan components FW-STD-TE&V-03 (and associated standards within each geographic area), FW-GDL-TE&V-08 and 09.
- Assess the percentage of openings that would occur within an area the size of a home range. Sauder and Rachlow (2014) defined open areas for fisher as forests with canopy cover from 0 to 9.9 percent. These open areas are generally equivalent to the VMap classes of “sparse vegetation”, “transitional forest” (recent disturbances) or non-forest categories. Their model predicted a decline in probability of occupancy by fisher where open areas comprise more than 5 percent of a potential home range. Incorporate desired conditions for open areas into prescriptions for treatment at the home range scale.
- Assess riparian management zones to see how they contribute to habitat connectivity between areas of mature and old-growth forest; incorporate desired conditions for connectivity in treatment prescriptions.

Flammulated owl

Available information on flammulated owl habitat is from studies conducted in regions of North America other than northwestern Montana, where the climate, soils, and habitat types are capable of producing large areas with conditions the flammulated owl needs. In comparison, the habitat capability of the Flathead National Forest is believed to be marginal for flammulated owl because of inherent limitations of climate, soils, and intermingled land ownership at lower elevations that provide potential habitat. Flammulated owls are associated with mature and old-growth dry ponderosa pine/Douglas-fir forests and are absent from mesic ponderosa pine and Douglas-fir forests, at least in some areas (Wright, Hejl, & Hutto, 1997). On the Forest, there is the potential to provide flammulated owl habitat in the warm-dry or potential vegetation type or drier portions of the warm-moist potential vegetation type, but these areas are limited on NFS lands. These potential vegetation types occur in portions of the Salish Mountains, Swan Valley, and South Fork geographic areas.

The following potential management approaches are most appropriately applied on a site-specific basis because scientific information on flammulated owl habitat in Montana is developing and the existing condition of complex landscape patterns needs to be assessed to meet desired conditions. Vegetation management projects in potential habitat could consider the following strategies to implement desired conditions for flammulated owls (Bull, Wright, & Henjum, 1990; McCallum, 1994; Wright, 1996):

- Assess where there are opportunities to enhance forest structure by creating a landscape pattern consisting of low canopy cover ponderosa pine/Douglas-fir forests, with grass or xeric shrub openings and patches of trees for roosting at the home range scale (Wright, 1996).
- Identify clusters of patches of mature and old-growth forest at least 35 to 40 acres in size. Assess whether these clusters have moderate but not dense tree canopy cover ranging from 35 to 65 percent to provide nesting habitat. Incorporate these desired conditions into prescriptions for treatment.
- In potential nesting habitat, assess whether there are defective live trees or snags with cavities or the potential for cavities excavated by the pileated woodpecker, northern flicker, or sapsucker. Incorporate these areas into prescriptions to meet geographic area snag standards (GA-SM-STD-02, GA-SF-STD-01, GA-SV-STD-01).
- Assess whether mature forest is interspersed with an open forest floor and grassy openings for feeding; incorporate these desired conditions into prescriptions for treatment.
- Assess whether mixed conifer patches or dense patches of small ponderosa pine/Douglas-fir are available for roosting within or next to mature stands that have snags providing potential nest sites; incorporate these desired conditions into prescriptions for treatment.

Clark's nutcracker

To implement FW-DC-WL DIV-01, see sections in this appendix on whitebark pine and ponderosa pine.

Townsend's big-eared bat and other bat species

Possible strategies that could be used to implement FW-DC-WL DIV-01 and FW-GDL-WL DIV-03 include the following:

- Work cooperatively with MFWP, the Montana Natural Heritage Program, and other cooperators to inventory caves for bats and to improve knowledge of baseline environmental conditions in caves while limiting disturbance to bats by coordinating activities or conducting activities when bats are less likely to be present.

- Work with MFWP, the Montana Natural Heritage Program, and other cooperators to monitor aquatic and riparian habitats for bats using mist netting and/or acoustic surveys.
- Monitor and reduce the risk of spread of white-nose syndrome by providing educational materials to visitors and local communities about (1) white-nose syndrome; (2) bat, cave, and other subterranean habitat conservation; and (3) proper decontamination techniques to reduce the risk of white-nose syndrome in bats.
- Survey old buildings or bridges for bats if they are proposed for removal. Once surveys have been conducted, include mitigation measures and design features in the proposed project as needed, based upon the site-specific analysis. Mitigation measures may include installation of structures to provide alternative bat habitat prior to removal. If practicable, activities could be timed to avoid the time periods when bats are present, but this may not be feasible in all circumstances. For example, an old building may be removed at any time, but a bridge may need to be removed or replaced during a time period when there is low water.

Timing of activities for wildlife

When implementing FW-GDL-WL DIV-05, consider site-specific factors. Examples of site-specific factors include tolerance of animals to ongoing disturbances at a particular site, topography, screening vegetation between an activity and a nest or den site, the duration of the activity, or the intensity of the activity. Key time periods listed in the guideline are based upon average dates and may be adjusted based upon site-specific verification.

Elk habitat security

- The decade-long Montana Cooperative Elk-Logging Study (Lyon et al., 1985) included portions of the Flathead National Forest and stressed the importance of security habitat where elk can go to avoid disturbance due to human activities. Security areas are especially important during the fall hunting season. Road access on public lands, combined with hunting season limits set by the State, have a combined effect on elk mortality and hunter opportunity (Christensen, Lyon, & Unsworth, 1993). Security areas help to maintain an elk population that is sufficient to provide hunter opportunity (Canfield, Lyon, Hillis, & Thompson, 1999) and a diverse bull age structure (MTFWP, 2004; Youmans, 1991). On the Forest, elk use of habitat during the hunting season varies from year to year depending upon snow depth (Simmons, 1974).
- Current knowledge indicates that during the hunting season, elk security habitat is provided by contiguous, nonlinear blocks of hiding cover that are larger than 250 acres and farther than one-half mile from open roads (Hillis et al., 1991). Hillis et al. noted that “vegetation density, topography, road access, hunter-use patterns and elk movements are variables that must be considered when applying these guidelines” (p. 38). Rugged topography may contribute to elk security habitat, even when cover provided by vegetation is limited. These variables were considered during development of plan components (see the definitions of “cover,” “security habitat,” and “elk security habitat” in the glossary).
- What is known about elk security habitat (see glossary) in northwest Montana is likely to be updated through upcoming cooperative research efforts. In addition the areas currently providing cover may be affected in the future. Events and activities such as wildfire, prescribed fire, timber harvest, or fuels reduction may temporarily reduce cover, and forest succession will occur and create new areas of cover. Additionally, new roads may be constructed and existing roads may be closed to meet changing ecological conditions and multiple-use objectives. The desired condition and guideline for the Salish Mountains geographic area (GA-SM-DC-05 and GA-SM-GDL-01) are intended to provide flexibility as conditions and knowledge change while maintaining elk habitat

security across the geographic area, consistent with the access management requirements outlined in Salish Mountains geographic area standard GA-SM-STD-01.

Potential strategies or approaches for the Salish Mountains geographic area

The following potential strategies are relevant to GA-SM-DC-05 and GA-SM-GDL-01:

- When evaluating a proposed project involving vegetation management and motorized public access, assess the impacts on the quality and effectiveness of elk security habitat, as determined by a project-specific environmental analysis. For example:
 - ♦ Consider the appropriate spatial scale for evaluating elk security habitat, based upon the best available scientific information. Elk on the Forest have been known to move from the south side of the Salish geographic area near Lake Mary Ronan up to 60 miles north, near Fortine on the Kootenai National Forest (Mann, 2013). Other elk are known to summer much closer to their winter range. Therefore, the area could be as large as the entire Salish Mountains geographic area or it could be much smaller.
 - ♦ GA-SM-GDL-01 states that in order to provide elk habitat security, access management actions should not result in a decrease in total acres of NFS lands within the geographic area that are at least 250 contiguous acres and at least 0.5 mile from roads open to wheeled motorized use by the public. Consider how the location of new roads and the management of motorized public access would maintain or increase the size and quality of security areas. Evaluate how the quality of existing elk security habitat is related to a variety of other factors that affect hunter access, such as distribution of motorized trails; closed roads inside a security area; open roads above and below a security area on a slope; nearby trailheads and parking areas; and gentle topography. The quality of elk security habitat may be higher if roads are closed yearlong rather than seasonally or by a barrier rather than a gate.
 - ♦ To meet the guideline's direction for a mosaic of cover and forage within areas of elk security habitat, evaluate recent vegetation changes. Consider the growth of trees in sapling stands, which can add to contiguous, nonlinear hiding cover patches that are larger than 250 acres by themselves or can connect smaller areas of hiding cover. Consider changes in the amount and/or distribution of cover from activities such as recent or proposed regeneration harvest.
 - ♦ If vegetation treatments are proposed in elk security habitat, consider how unit design and prescriptions could provide a mosaic of successional stages over the long term, with a variety of stand structures and species compositions. Consider prescriptions for group selection, commercial thinning, irregularly shaped harvest units, retention of leave patches within regeneration harvest units, or deferring treatment in some areas. Although not required by GA-SM-GDL-01, consider maintaining areas of cover that are both contiguous and large in acreage.

All wildlife species

Potential strategies or approaches that may be used in the management of wildlife include the following:

- Cooperate in interagency, non-government organizations, and citizen science survey efforts of alpine and subalpine habitats and associated species (e.g., Clark's nutcracker, white-tailed ptarmigan, gray-crowned rosy finch, pika, hoary marmot, wolverine) to monitor effects of the changing climate.

Non-Native Invasive Plants

Potential strategies or approaches that may be used in the management of invasive plants include the following:

- Use guidance provided in the Flathead National Forest Noxious and Invasive Weed Control environmental assessment and decision notice (USDA, 2001a) (“weed control decision notice”) in implementing integrated pest management on the Forest.
- Prioritize weed treatments to follow guidance in the weed control decision notice and in the forest plan (FW-DC-NNIP-01, FW-OBJ-NNIP-01), using an adaptive strategy to determine where, when, and how to treat weeds and weed-infested sites. This strategy and its implementation include consideration of such factors as
 - ◆ weed category—potential invader, new invader, or widespread invader,
 - ◆ relative invasive nature of the species and its potential to displace native vegetation,
 - ◆ location—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,
 - ◆ control method, which is dependent on the species and site,
 - ◆ site monitoring to determine the need to repeat or alter treatment,
 - ◆ available funding and economic considerations (i.e., cost/benefit), and
 - ◆ timing, as related to the seasonal plant life cycle and its influence on treatment effectiveness.
- Use weed management program strategies outlined in the weed control decision notice, such as
 - ◆ offer public education, both formal conservation education contacts (schools, campgrounds, etc.) and informal (i.e., brochures, weed identification and prevention brochures);
 - ◆ provide continuing education for Forest field personnel in weed identification;
 - ◆ pursue and coordinate cooperative multi-ownership weed control efforts, such as by sharing resources and information, setting treatment priorities, and applying for and sharing grants;
 - ◆ employ prevention efforts, such as the use of weed- and seed-free hay and straw by users of Flathead NFS lands and for reseeding projects;
 - ◆ use native plants to revegetate disturbed areas where appropriate; and
 - ◆ require, contractually in timber sale contracts, that off-road equipment be washed before entering and moving between sites on the Forest.
- Exclude grazing when new invasive plant species infestations (specifically priority 1a and 1b species on the Montana State noxious weeds list) are found in allotments until the infestation is completely eradicated. These economically damaging species include Dyer’s woad, rush skeletonweed, and yellow starthistle.
- Use an integrated weed management approach that considers impacts of proposed methods of weed control on native pollinators.

Fire Management and Air Quality

Fire management approaches are designed to restore fire-adapted landscapes and reduce risk to people, communities, and values. These approaches also support the three objectives of the National Cohesive Wildland Fire Management Strategy (USDI-USDA, 2011), which are to 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 by 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.

Management approaches for mechanical fuels treatments

Mechanical fuels treatments in the wildland-urban interface should be designed such that, under less than extreme conditions, fires can contribute to resource objectives with minimal impact to values at risk and responders can take appropriate actions. Under extreme conditions, fire should occur without significant loss of values at risk. When vegetation is treated, maintenance will be required in the future to perpetuate the objectives of the treatment.

The strategies below may be considered for maintaining or trending towards the objective FW-OBJ-FIRE-01:

- **Shaded fuel breaks:** Use these treatments to thin the overstory and open up the understory yet retain enough overstory canopy to retain shade, which reduces understory growth in order to reduce fire intensity, which aids in fire response. Maintenance entries may be mastication, mowing, or burning. Potential locations include around developed sites on the Forest, along the Forest boundary with private lands, and along critical travel and infrastructure corridors.
- **Canopy removal/thinning:** Use these treatments to reduce fire movement between crowns of trees and where the objective is to keep a crown fire from initiating or to get a crown fire to drop to the ground. Potential locations include areas upwind from critical values at risk.
- **Treat timber stands** to reduce the opportunity for fire to travel from the ground to the canopy.
- **Use multiple entries of fire** (wildland and/or prescribed) to reduce seed sources of existing species such as lodgepole in order to support the presence of other species such as ponderosa pine or larch.

Management approaches for prescribed fires (planned ignitions)

Potential strategies that may be used to trend towards desired conditions and objectives for prescribed fire management include the following:

- **Burn in autumn** when grasses and shrubs have initiated dormancy to promote resprouting of species such as willows, serviceberry, and maple to provide food for wildlife species. At a landscape scale, retain unburned areas over at least 50 percent of a winter range unit to provide forage for the upcoming winter.
- **Use burning prescriptions** that maintain the deep duff layer to promote the survival of huckleberry plants, if present.
- **Use burning prescriptions** that are relatively hot to scarify the seed of redstem ceanothus, if present.
- **Conduct education and outreach** to communities.

- Support air quality-related monitoring activities and determine sensitivity indicators for wilderness areas.
- Review projects and management activities that may affect values related to air quality.

Management approaches for unplanned ignitions

Potential strategies for fire management (unplanned ignitions, wildfire) could include risk assessment at multiple scales, both spatial and temporal. These assessments are grounded in experience and analyzed with data and models appropriate to the scale of analysis. The approach is to look at risk in three tiers: long term (5–10 years), annual, and incident:

- Long term: Analyze the existing conditions that typically change in the 5 to 10-year time frame, using the analysis to inform broad questions and decisions for programmatic risk assessments. Items may include highly valued resources and assets such as structures, infrastructure, commercial timber, and wildlife habitat.
- Annual: Analyze factors such as seasonal weather, fuels condition, and drought impacts to inform decisions pre-season by identifying areas that, with reduced large fire/long-duration risk, may have the opportunity for short-duration fire management.
- Incident: When an ignition occurs, utilize the now known specific condition, location, etc., to specifically analyze the situation for incident risk assessments.

This three-tiered risk analysis allows managers to make informed decisions that respond to the Forest's various desired conditions.

Data on past weather and historic fire occurrences can inform the decisions at the level of the annual assessment, using figure c-9 as a reference. Additional possible strategies include the following:

- Communicate and collaborate with appropriate agency leadership during fire incident management, for wildfires that affect identified areas of local, State, or tribal importance, to identify and, to the extent practical, protect these values and minimize impacts to resources or areas of importance.
- Communicate with the Rocky Mountain Research Station and consult manual direction (Forest Service Manual 4063), as well as individual establishment records, for wildfire response when near or within research natural areas (management area 4a). Although the natural process of fire is generally desired within research natural areas, the effects on some plant communities, related directly to the fire or to suppression efforts, may need to be considered.

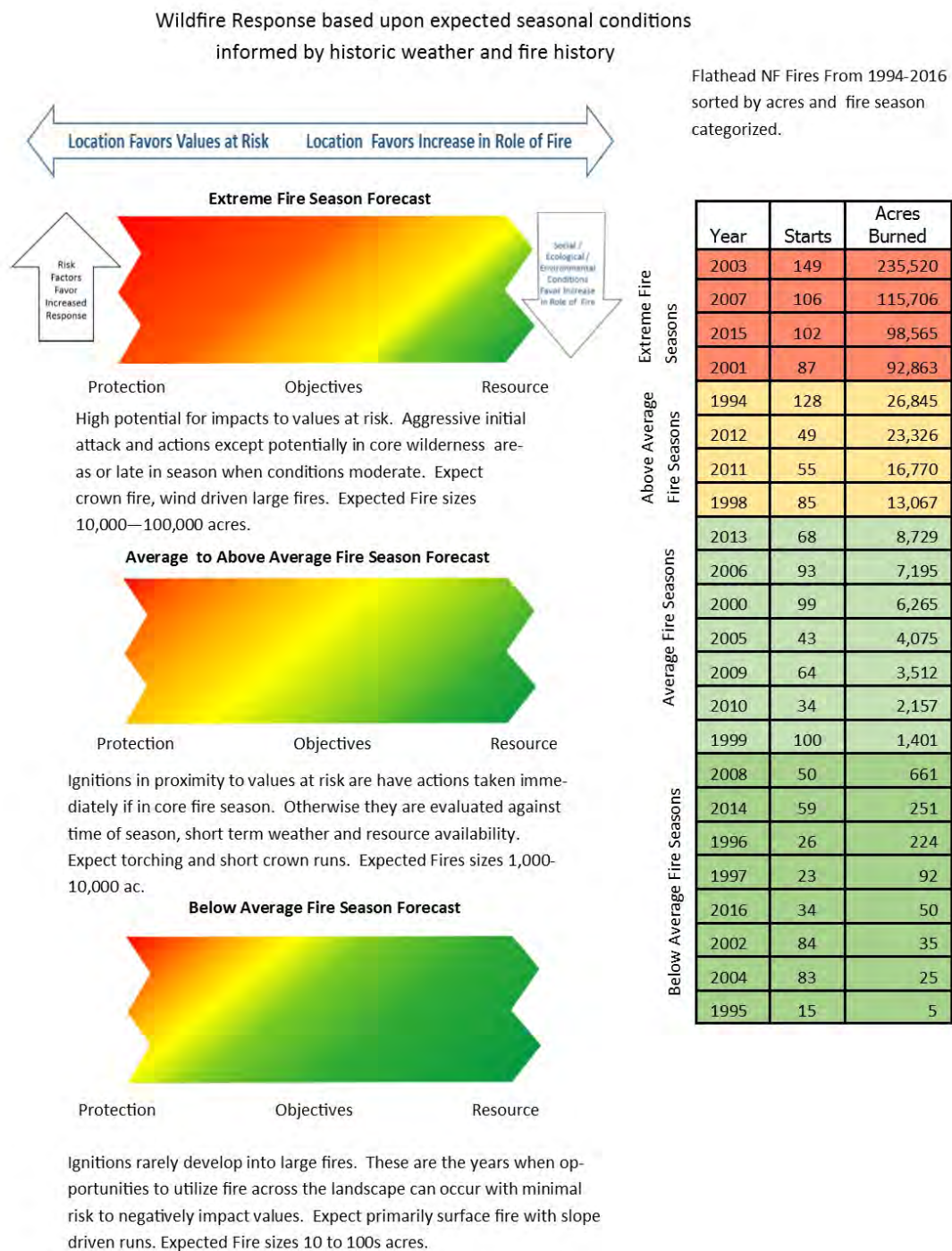


Figure C-9. Wildlife response based upon expected seasonal conditions informed by historic weather and fire history

Management approaches for air quality

Potential strategies to inform decisions related to air quality may include the following:

- Use temporary air quality monitors when there is potential for smoke generated from prescribed fire to inform the public of the health effects.
- Use an air resource specialist on fire-related incidents to provide the specific information to inform communities of expected impacts and assist in educating the public on how to mitigate impacts from reduced air quality.

Recreation

Potential management strategies assist in (1) providing a range of recreation opportunities across the Forest while controlling visitor impacts to resources and other visitors; (2) constructing, maintaining, and controlling use of facilities and trails; and (3) providing a positive visitor experience. Potential strategies include the following:

- Prioritize reconstruction of campgrounds based on the Forest's recreation niche and the updated recreation site facility master planning document. Align and rightsize recreation infrastructure to complement the regional and Forest niche.
- Evaluate potential for new motorized over-snow vehicle opportunities and evaluate areas for restricting motorized over-snow vehicle opportunities.
- Develop a comprehensive river management plan for the Flathead Wild and Scenic River. Coordinate with appropriate State and Federal agencies when developing and implementing the plan.
- Complete a needs assessment to determine the need for new outfitter, guide, and livery services on the Forest outside of designated wilderness.
- Evaluate the need and location for a hut-to-hut system on the Forest. Work with partners on funding needs.
- Inform and educate users about Leave No Trace techniques for responsible outdoor activities with minimal impacts on NFS lands.
- Integrate the recreation opportunity spectrum into project-level designs and management decisions.
- Address dispersed campsites with erosion or sanitation issues that need rehabilitation by prioritizing sites that protect or maintain wild and scenic river corridors or bull trout habitat or are located within the grizzly bear primary conservation area.
- Address developed campgrounds that need improvements by prioritizing improvements that address accessibility, health and safety, a particular type of use, or reduction of grizzly bear-human interaction.
- Consider protection and maintenance of a building or site's historic character when identifying cabins to place on the National Reservation System to meet public demand.
- When existing developed or dispersed recreation sites are negatively impacting aquatic resources and riparian resources, apply measures that are appropriate to the type of degradation, such as hardening sites or placing barriers to control access to riparian management zones. In severe situations, close, rehabilitate, or relocate the developed or dispersed recreation site outside of the riparian management zone.

Designated Wilderness

Consider guidance provided in the Bob Marshall, Great Bear, Scapegoat Wildernesses: Recreation Management Direction (USDA, 1987). Potential strategies for wilderness management include the following:

- Revise the existing wilderness management plan for the Mission Mountains Wilderness, coordinating with the Confederated Salish and Kootenai Tribes when revising.
- Develop a limits of acceptable change plan through a public participation process.
- Implement the national wilderness stewardship performance measures and wilderness character monitoring.

Recommended Wilderness

Potential strategies for management of recommended wilderness areas include the following:

- Complete site-specific analyses of mechanized transport and motorized uses in recommended wilderness areas.

Wild and Scenic Rivers

- Use guidance provided in the Wild and Scenic River Act and outlined in the Flathead Wild and Scenic River Management Plan (USDA, 1980) and the Flathead River Wild and Scenic Recreation Management Direction (USDA, 1986) to manage these river segments.
- Develop a comprehensive river management plan for the Flathead Wild and Scenic River. Coordinate with appropriate State and Federal agencies when developing and implementing the plan.

Other Special Designations

Research natural areas (management area 4a)

A major objective of the Forest Service's research natural area program is to maintain a representative array of all significant natural ecosystems as baseline areas for research and monitoring. The Flathead National Forest has six established research natural areas. The Region 1 Natural Areas Assessment (Chadde, Kimball, & Evenden, 1996) recommended new research natural area targets for each Forest based on plant community type and priority and the likelihood of its occurring on a particular Forest. Table C-8 and table c-9 display the as-yet-unfilled plant community type research natural area target recommendations and the associated priority ranking for the Flathead National Forest resulting from the Region 1 assessment.

Table C-8. Unfilled research natural area target recommendations for the forest and woodland class and priority ranking for the Flathead National Forest

Forest and Woodland	Priority Ranking
<i>Abies grandis</i> / <i>Athyrium filix-femina</i>	moderate
<i>Abies lasiocarpa</i> / <i>Oplopanax horridum</i>	high
<i>Picea engelmannii</i> / <i>Lysichiton americanum</i>	high
<i>Pseudotsuga menziesii</i> / <i>Agropyron spicatum</i>	moderate
<i>Pseudotsuga menziesii</i> / <i>Cornus stolonifera</i>	high

Forest and Woodland	Priority Ranking
<i>Pseudotsuga menziesii</i> / <i>Festuca idahoensis</i>	high
<i>Pseudotsuga menziesii</i> / <i>Festuca scabrella</i>	high
<i>Thuja plicata</i> / <i>Athyrium filix-femina</i>	high

Table C-9. Unfilled research natural area target recommendations for the shrubland and herbaceous class and priority ranking for the Flathead National Forest

Shrubland and Herbaceous	Priority Ranking
<i>Purshia tridentata</i> / <i>Festuca scabrella</i>	high
<i>Festuca scabrella</i> / <i>Agropyron spicatum</i>	high
<i>Festuca scabrella</i> / <i>Festuca idahoensis</i>	high

Field inventories are needed to identify whether these plant community types occur and, if so, where they are located on the Flathead National Forest. As opportunities arise, inventories could be conducted and the process for establishing additional research natural areas could be initiated. Potential strategies to conduct inventories may include partnering with non-agency groups or organizations to locate and inventory the rare plant communities identified in the tables.

The overall approach for the management of research natural areas is developed through the cooperative relationship between the Forest Service and the Rocky Mountain Research Station (see the work of Evenden and others (2001) for additional information on research natural areas). The research station director, with the concurrence of the forest supervisor, may authorize management practices that are necessary for invasive weed control or to preserve the vegetation for which the research natural area was created (Forest Service Manual 4063.3). As stated in the Forest Service Manual, limited use of vegetation management may occur within research natural areas in situations where the vegetative type would be lost or degraded without management. The criterion is that management practices should provide a closer approximation of the naturally occurring vegetation and the natural processes governing the vegetation than would be possible without management. These practices may include prescribed burning.

In the case of unplanned ignitions that occur in or near research natural areas, consider that the natural process of fire is desirable in research natural areas but may also have potential impacts on plant communities at risk. These impacts would generally be considered acceptable (unless the fire severity is considered outside the natural range of variation), but consulting research natural area establishment records, manual direction (i.e., Forest Service Manual 4063), and Rocky Mountain Research Station personnel for additional guidance concerning fire management is recommended.

Special areas (management area 3b)

Forest Service Manual 2372 provides direction for development, occupancy, and public use of special areas. Certain kinds of facilities and uses are allowed for interpretive purposes and public use or enjoyment, “up to a level that will insure protection of the special values for which the area was established.” Occupancy and use are allowed “to the extent they neither interfere with the primary values for which the area was established nor negatively affect the visitor’s experience.”

Possible management approaches and strategies for special areas may include the following:

- Prepare establishment records for new special areas, which could include specific discussion about the features for which they are being recommended, management guidance, and other related documentation.

- Evaluate vegetation management or other activities near special areas for potential impacts to plant species and communities, wildlife, hydrology, and other associated qualities of the special area.

Coram Experimental Forest (management area 4b)

The overall strategy for managing the Coram Experimental Forest is through the letter of agreement that was made, and entered into, by the Flathead National Forest and Rocky Mountain Research Station (USDA, 2016). The agreement provides the operating plan and management guide and defines the relationship between the Rocky Mountain Research Station and the Flathead National Forest regarding the Coram Experimental Forest. The agreement was prepared in accordance with the requirements and policies set forth in Forest Service Manual 4062, specifically 4062.5 describing experimental forest management plans.

Infrastructure

The overall maintenance strategy for NFS roads is to efficiently maintain NFS roads and reduce the backlog of deferred maintenance. Specific elements of this strategy could include the following:

- Store infrequently used roads over the long term.
- Reduce maintenance levels on low-use roads but continue to maintain road drainage features.
- Shift roads with high residential access needs to non-Forest Service jurisdictions.
- Cooperate with other agencies on access, road management, and maintenance.
- Improve, close, or decommission roads that have adverse impacts on aquatics, watersheds, or wildlife.
- Apply dust abatement treatments during weather conditions that promote the binding of the treatments to road surface materials.
- When placing road segments in intermittent stored service, at stream crossings consider
 - ♦ replacing or removing culverts or drainage structures that do not meet size or capacity requirements, and if removing a culvert, excavate to the natural stream grade and natural side slopes, or the latter to a 1:1 ratio, whichever is less;
 - ♦ constructing armored overflow channels if culverts are retained; and
 - ♦ stabilizing areas prone to erosion and/or cut-and-fill failure.
- Complete a trails assessment that uses a systematic approach to define the Forest's desired and sustainable trail system.
- During project-level National Environmental Policy Act assessments, identify forest system trails that require mitigation measures to protect trail tread.
- Identify the trail corridor and associated features for the Pacific Northwest National Scenic Trail comprehensive management plan when completed.
- Use the Forest's travel analysis report (USDA, 2014) to inform project-level decisions.
- Maintain grass/forbs to reduce the chance of fire being carried to infrastructure by watering and/or cutting and trimming.
- The ground contact of infrastructure should be fire-resistant material (cement block or metal).
- Thin shrubs and trees to reduce the effects of high-intensity fire.

- Maintain infrastructure exteriors by utilizing fire-resistant materials for repairs or replacement (e.g., roofing).
- Follow Firewise guidelines (firewise.org) for defensible space around administrative and recreation developments.

Lands

The strategy for lands management could include the following elements:

- Adjust land ownership through purchase, exchange, or other authority to protect resources and improve efficiency of management.
- Consider criteria such as the following (not presented in any particular order) when evaluating land adjustments:
 - ◆ lands that can contribute to the 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 that contain rivers with potential for wild and scenic river designation
 - ◆ other environmentally sensitive lands
 - ◆ lands that reduce administrative expenses and support logical and efficient management
- Consider criteria such as the following (not presented in any particular order) when evaluating land adjustments for conveyance:
 - ◆ lands and administrative buildings adjacent to communities that are chiefly valuable for non-NFS uses
 - ◆ lands with low resource value
 - ◆ 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 for sale or exchange under the Small Tracts Act
- Prioritize NFS land boundary surveys to areas where trespass is most likely.
- Identify areas generally suitable for utility corridors and communication sites.
- Authorize and administer appropriate occupancy and use of NFS lands.

Other Forest Products

To contribute to meeting desired conditions for providing other forest products to the public (FW-DC-OFP-01), and to provide opportunities to contribute to the firewood program through vegetation management activities (FW-DC-OFP-03), the following management approaches may be considered:

- Temporarily opening roads that are currently closed to the public for purposes of gathering firewood. As required in guideline FW-GDL-OFP-01, measures should be taken prior to opening a road to protect the most valuable snags as habitat for wildlife.
- During project-level analysis, identify areas where firewood gathering, either for personal use or commercial sale, may be an appropriate and desired activity.
- Providing opportunity for personal use firewood gathering from slash piles created through harvest activities (such as landing piles).
- During project-level analysis, identify areas where they may be opportunity for cutting of live birch trees as firewood, either for personal use or for commercial sales. These opportunities would be integrated with the desired conditions for hardwood tree communities (FW-DC-TE&V-09).

To lessen impacts on huckleberry plants by harvest activities, the following approaches may be considered:

- Within harvest units where there may be an abundance of huckleberry, use logging and site-preparation methods that lessen mechanical disturbance to the roots and root crowns of huckleberry plants.
- Leave a greater density of overstory trees (i.e., more than 20 mature trees per acre) within units on drier, more exposed aspects that support huckleberries, which could improve conditions for huckleberry growth and berry production.

Minerals

The minerals strategy could include the following elements:

- Provide mineral materials such as gravel, riprap, and landscape rock for Forest Service, personal, and interagency use and limited commercial sales in accordance with material source development and rehabilitation plans.
- Identify, evaluate, map, and inventory all known cave resources not previously designated as significant.
- Evaluate and mitigate geologic hazards associated with the location and construction of new facilities before they are approved, designed, and constructed.
- Manage caves to minimize evidence of human use and to protect cave resources. Partnerships and mutual support agreements could be used to specify schedules, party sizes, skills required, equipment, and handling. Pursue funding and partnerships to manage cave resources.

Livestock Grazing

The general approach to grazing management implements resource management practices intended to maintain the health of occupied livestock grazing allotments and rangelands. Strategies for accomplishing this approach may include the following:

- Assess and update allotment management plans to ensure that sustainable stocking levels, forage utilization standards, mitigation measures, and appropriate grazing systems are used and that the lands are still suitable for livestock grazing.
- Eliminate grazing allotments or pastures as they become vacant if there is no demand for grazing by potential permittees or if desired vegetation and aquatic conditions cannot be met.

Cultural Resources and Areas of Tribal Importance

The cultural resources strategy could include the following elements:

- Conduct surveys to identify sites and follow-up actions necessary to protect, stabilize, or salvage sites.
- Use partnership arrangements to help preserve and interpret significant heritage resources.
- Guide project planning and heritage preservation and interpretation efforts with knowledge and information gained through inventories, site evaluations, tribal consultation, and other sources.
- Develop and participate in national, regional, interregional, and interagency programmatic agreements and memoranda with the State Historic Preservation Office, the Advisory Council on Historic Preservation, tribes, and other partner agencies.
- Stabilize, rehabilitate, restore, and care for cultural resources.
- Perform maintenance on historic facilities.
- Promote heritage values through public education, outreach, and interpretative programs.
- Conduct scientific and historic research on cultural resources.
- Provide ongoing training to Forest employees and volunteers to help ensure that management activities do not damage known or potential cultural resources.
- Protect the Forest's collection of historic photographs, maps, artifacts, manuscripts, recordings, and other primary sources by ensuring proper archival storage on the Forest or by transferring items to a National Archives and Records Administration Federal Records Center or other appropriate facility.

Conservation Education

The conservation education strategy could include the following elements:

- Develop a formal, forestwide conservation education, interpretive, and visitor information strategic plan to guide program delivery, ensure coordinated and effective services, and build strong relationships with partners and communities.
- Use diverse methods and media for program delivery.
- Make the best use of new technologies to help maintain audience interest by employing social media, Web/Internet presence, and self-guided media such as smartphones and other portable devices.

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Appendix D: Potential Vegetation Types

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Introduction

This appendix provides a summary of the plant communities associated with the potential vegetation types, which forms the basis for many forest plan components related to vegetation and wildlife habitat in the revised plan.

Description of Potential Vegetation Types

Lands across the Flathead National Forest have been grouped into areas of similar biophysical characteristics for purposes of analysis at the forestwide scale and the development of forest plan components. These groupings are referred to as *potential vegetation types* in the revised plan, and are consistent with the USDA Forest Service Northern Region (Region One) broad potential vegetation types as described in Milburn and others (Milburn, Bollenbacher, Manning, & Bush, 2015). These potential vegetation types are designed for use at the broad-scale level of analysis, such as forest-wide or geographic area. They are a coarse grouping of the Northern Region habitat type groups, which in turn are groupings of individual habitat types (Pfister, Kovalchik, Amo, & Presby, 1977). Habitat types are an aggregation of ecological sites of like biophysical environments (such as climate, aspect, soil characteristics) that produce plant communities of similar composition, structure, and function. The vegetation communities that would develop over time given no major natural or human disturbances (i.e., the climax plant community) would be similar within a particular habitat type or potential vegetation type map unit.

Potential vegetation types serve as a basis for describing certain ecological conditions across the Forest and are useful in understanding the various ecosystems on the Forest and their potential productivity, natural biodiversity, and the kinds of processes that sustain these conditions. They provide an understanding of the *potential* vegetation conditions that might occur over time on a particular site. In contrast, the *existing* vegetation condition, or plant community, describes what currently exists on a particular site. The characteristics of existing plant communities can be highly variable over time and space at any one particular point in time or within a particular potential vegetation type. The existing conditions reflect each site's unique history, forest character, pattern of disturbances, and point in time along the successional pathway.

Table D-1 below provides the approximate percentages and acreages of each potential vegetation type within the geographic areas on the Flathead National Forest. Table D-2 displays the habitat types associated with each potential vegetation type for the final revised plan. The table also displays the various groupings of habitat types that were used in the course of the revision process, and the terminology used for those groupings, for purposes of clarity if these earlier documents or analysis are ever referenced in the future.

Maps B-03 through B-09 display the potential vegetation types for the final revised plan. These maps information provides insight into the distribution of potential vegetation types and the pattern of environmental and vegetative conditions across the Forest, and is a broad-scale, programmatic representation of the potential vegetation types across the Flathead. These maps may be updated and improved over time as new information, methodology or technology becomes available that allows for more accurate portrayal and mapping of potential vegetation types. In addition, at the project-level of analysis, habitat types, and the associated potential vegetation type are expected to be verified for purposes of applying forest plan direction. This verification typically occurs while conducting reconnaissance and surveys that gather the site-specific information on forest and habitat conditions necessary for developing proposed treatments.

Table D-1. Estimated percentages and acreages^a of each potential vegetation type on NFS lands within each geographic area (GA) on the Flathead National Forest and forestwide^b

Potential Vegetation Types	Hungry Horse GA	Middle Fork GA	North Fork GA	Salish Mountains GA	South Fork GA	Swan Valley GA	Total Percentages & Acreages Forestwide
Warm-Dry	5% 13,200	5% 17,600	2% 6,200	18% 48,400	14% 109,100	8% 28,000	9% 222,400
Warm-Moist	2% 6,200	< 1% 800	4% 12,900	5% 13,000	< 1% 600	20% 72,700	4% 106,200
Cool-Moist	85% 242,700	75% 275,300	72% 228,100	76% 198,900	58% 459,700	57% 207,300	68% 1,612,100
Cold	6% 17,000	14% 53,000	21% 67,400	1% 1,800	21% 163,600	9% 32,600	14% 335,400
Grass/forb/shrub Hardwood Non-forested	2% 5,900	6% 21,900	1% 4,300	< 1% 300	7% 54,300	6% 22,000	5% 108,700
Total acres	284,900	368,600	318,900	262,400	787,300	362,600	2,385,200

- a. All acreage figures in the table are estimates and are rounded to the nearest 100 acres. Water is excluded. The figures do not match exactly with acreages in other sections of the forest plan due to variations resulting from the GIS analysis process and the use of different data sets for acreage calculations (for example, a summary of acreages by potential vegetation type from the Forest Inventory and Analysis data set would produce slightly different acres).
- b. Data source: Flathead National Forest GIS Library, R1 VMap layer (2009, updated to 2012 for changes due to disturbances), joined with potential vegetation types GIS layer (Jones, 2004).

Table D-2. Cross-reference of Flathead National Forest habitat types and the potential vegetation type groupings used in the Flathead National Forest plan revision process and associated analyses.

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
WARM-DRY	psme1	PSME	5,895	0.26	Warm dry	Warm dry	A2
WARM-DRY	psme1	PSME/AGSP	7,369	0.33	Warm dry	Warm dry	A2
WARM-DRY	psme1	PSME/FEID	10,317	0.26	Warm dry	Warm dry	A2
WARM-DRY	psme2	PSME/VACA	17,685	0.56	Warm dry	Warm dry	B2
WARM-DRY	psme2	PSME/PHMA-CARU	10,317	0.52	Warm dry	Warm dry	B2
WARM-DRY	psme2	PSME/VAGL-XETE	57,478	2.15	Warm dry	Warm dry	B2
WARM-DRY	psme2	PSME/LIBO-SYAL	14,738	0.48	Warm dry	Warm dry	C1
WARM-DRY	psme2	PSMA/LIBO-CARU	5,895	0.26	Warm dry	Warm dry	C1
WARM-DRY	psme2	PSME/SYAL	5,895	0.26	Warm dry	Warm dry	B2
WARM-DRY	psme2	PSME/SYAL-AGSP	4,421	0.26	Warm dry	Warm dry	B2
WARM-DRY	psme2	PSME/SYAL-CARU	26,528	1.3	Warm dry	Warm dry	B2
WARM-DRY	psme3	PSME/CARU	5,895	0.26	Warm dry	Warm dry	B1
WARM-DRY	psme3	PSME/CARU-AGSP	5,895	0.26	Warm dry	Warm dry	B1
WARM-DRY	psme3	PSME/CARU-CARU	35,371	1.56	Warm dry	Warm dry	B1
WARM-DRY	psme3	PSME/CAGE	5,895	0.26	Warm dry	Warm dry	B1
WARM-DRY	psme3	PSME/ARUV	0	0	Warm dry	Warm dry	B1
WARM-DRY	psme3	PSME/SPBE	5,895	0.26	Warm dry	Warm dry	B2

¹ Groupings of habitat types are based upon Milburn (2015).² Acreage estimates are from R1 Summary Data Base Reports (FIA Hybrid 2011) and represent the habitat types recorded in the field on the Forest Inventory and Analysis plots.³ The potential vegetation type groups used in the assessment varied depending on the key ecosystem characteristic, but this represents the primary grouping used.

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
WARM-DRY	psme3	PSME/JUCO	7,369	0.35	Warm dry	Warm dry	B1
WARM-DRY	abgr2	ABGR/XETE	5,895	0.26	Warm dry	Warm dry	C1
WARM-DRY	abgr2	ABGR/LIBO-LIBO	11,790	0.52	Warm dry	Warm dry	C1
WARM-MOIST	tshe	TSHE	5,895	0.26	Warm moist	Cool moist	D1
WARM-MOIST	abgr3	ABGR/CLUN	5,895	0.26	Warm moist	Warm moist	C2
WARM-MOIST	abgr3	ABGR/CLUN-CLUN	17,685	0.78	Warm moist	Warm moist	C2
WARM-MOIST	abgr3	ABGR/CLUN-ARNU	11,790	0.52	Warm moist	Warm moist	C2
WARM-MOIST	abgr3	ABGR/CLUN-XETE	11,790	0.52	Warm moist	Warm moist	C2
WARM-MOIST	thpl1	THPL/OPHO	0	0	Warm moist	Cool wet	E1
WARM-MOIST	thpl2	THPL/CLUN	17,685	0.78	Warm moist	Warm moist	D1
WARM-MOIST	thpl2	THPL/CLUN-CLUN	41,266	2.08	Warm moist	Warm moist	D1
WARM-MOIST	thpl2	THPL/CLUN-MEFE	1,474	0.07	Warm moist	Warm moist	D1
WARM-MOIST	tshe	TSHE/CLUN	11,790	0.52	Warm moist	Cool moist	D1
WARM-MOIST	tshe	TSHE/CLUN-CLUN	5,895	0.26	Warm moist	Cool moist	D1
WARM-MOIST	tshe	TSHE/CLUN-ARNU	11,790	0.52	Warm moist	Cool moist	D1
COOL-MOIST	picea	PICEA	1,474	0.07	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	picea	PICEA/EQAR	4,421	0.2	Cool moist-Mod Dry	Cool wet	D3A
COOL-MOIST	picea	PICEA/CLUN	5,895	0.26	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	picea	PICEA/CLUN-VACA	11,790	0.52	Cool moist-Mod Dry	Cool moist	D3A

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
COOL-MOIST	picea	PICEA/CLUN-CLUN	5,895	0.26	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	picea	PICEA/GATR	13,264	0.43	Cool moist-Mod Dry	Cool wet	D3A
COOL-MOIST	picea	PICEA/SMST	22,107	0.78	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	picea	PICEA/LIBO	0	0	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	picea	PICEA/VACA	0	0	Cool moist-Mod Dry	Cool moist	F1
COOL-MOIST	abla2	ABLA	13,264	0.78	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla1	ABLA/OPHO	39,792	1.56	Cool moist-Mod Dry	Cool wet	E2
COOL-MOIST	abla1	ABLA/GATR	14,738	0.72	Cool moist-Mod Dry	Cool wet	E2
COOL-MOIST	abla1	ABLA/GATR	5,895	0.26	Cool moist-Mod Dry	Cool wet	E2
COOL-MOIST	abla1	ABLA/CACA	14,738	0.65	Cool moist-Mod Dry	Cool wet	E2
COOL-MOIST	abla1	ABLA/CACA-CACA	11,790	0.33	Cool moist-Mod Dry	Cool wet	E2
COOL-MOIST	abla2	ABLA/CLUN	42,740	1.89	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/CLUN-CLUN	128,219	5.47	Cool moist-Mod Dry	Cool moist	D3A

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
COOL MOIST	abla2	ABLA/CLUN-ARNU	73,689	3.06	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/CLUN-VACA	17,685	0.78	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/CLUN-XETE	147,379	6.29	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/CLUN-MEFE	104,639	4.04	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/LIBO	11,790	0.33	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/LIBO-LIBO	29,476	1.3	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/LIBO-XETE	23,581	1.04	Cool moist-Mod Dry	Cool moist	D3A
COOL-MOIST	abla2	ABLA/LIBO-VASC	16,212	0.52	Cool moist-Mod Dry	Cool moist	F1
COOL-MOIST	abla2	ABLA/MEFE	310,969	13.15	Cool moist-Mod Dry	Cool moist	D3B
COOL-MOIST	abla2	ABLA/ALSI	16,212	0.72	Cool moist-Mod Dry	Cool moist	D3B
COOL-MOIST	abla3	ABLA/VACA	50,109	1.63	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/XETE	100,218	4.62	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/XETE-VAGL	191,592	8.03	Cool moist-Mod Dry	Cool mod dry	F1

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
COOL-MOIST	abla3	ABLA/VAGL	23,581	0.85	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/CARU	14,738	0.65	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/ARCO	5,869	0.26	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/CAGE	11,790	0.52	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	abla3	ABLA/CAGE-PSME	5,895	0.26	Cool moist-Mod Dry	Cool mod dry	F1
COOL-MOIST	pico	PICO	4,421	0.26	Cool moist-Mod Dry	Cool mod dry	F1
COLD	abla3	ABLA/XETE-VASC	119,377	5.09	Cool moist-Mod Dry	Cool mod dry	F1
COLD	abla3	ABLA/VASC-CARU	5,895	0.26	Cool moist-Mod Dry	Cool mod dry	F1
COLD	abla3	ABLA/VASC-VASC	25,054	1.11	Cool moist-Mod Dry	Cool mod dry	F1
COLD	abla4	ABLA/VASC	8,843	0.39	Cool moist-Mod Dry	Cool mod dry	F1
COLD	abla4	ABLA-PIAL/VASC	23,581	1.24	Cold	Cold	G1
COLD	abla4	ABLA/LUHI	30,950	1.37	Cold	Cold	G1
COLD	abla4	ABLA/LUHI-VASC	16,212	0.78	Cold	Cold	G1
COLD	abla4	ABLA/LUHI-MEFE	64,847	2.6	Cold	Cold	G1
COLD	tsme2	TSME/LUHI	0	0	Cold	Cold	G1

FOREST PLAN: Potential Vegetation Type (R1 Broad PVT¹)	R1 Montana Potential Vegetation Type (Jones, 2004)	Habitat type name (Pfister et al., 1977)	Acres (approx.) (National Forest System lands)²	Percent (approx.)	For reference: Biophysical Setting (used in forest plan proposed action and draft EIS)	For reference: Potential Vegetation Type Group³ (used in Flathead National Forest assessment)	For reference: SIMPPLLE model Habitat Type Group (used in natural range of variation and future vegetation condition analysis)
COLD	tsme2	TSME/MEFE	0	0	Cold	Cold	G1
COLD	tsme2	TSME/XETE	0	0	Cold	Cold	G1
COLD	pial	PIAL-ABLA	88,427	4.04	Cold	Cold	G2
COLD	laly	LALY-ABLA	16,212	0.72	Cold	Cold	G2
NONFOREST	nf	SCREE	44,214	2.19	Nonforest	Nonforest	NF
NONFOREST	potfru	FEID/SHRUB	5,895	0.26	Nonforest	Nonforest	SHRUB
NONFOREST	ripgrass	CAREX	1,474	0.07	Nonforest	Nonforest	GRF
NONFOREST	fesida	FEID	1,474	0.09	Nonforest	Nonforest	GRF
NONFOREST	fesida	FEID/SEDGE	1,474	0.07	Nonforest	Nonforest	GRF
NONFOREST	nf	NF	2,948	0.13	Nonforest	Nonforest	NF
NONFOREST	ripgrass	GRASS	4,421	0.2	Nonforest	Nonforest	NF
TOTAL			2,350,663	100%			

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Appendix E: Watershed Condition Framework and Conservation Watershed Network

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Introduction

One of the original purposes for establishing the National Forest System was to protect the nation's water resources. The 2012 planning rule includes a newly created set of requirements associated with maintaining and restoring watersheds and aquatic ecosystems, water resources, and riparian areas within the plan area. The increased focus on watersheds and water resources in the 2012 planning rule reflects the importance of this natural resource and the Forest Service's commitment to stewardship of our waters.

The 2012 planning rule requires that plans identify watersheds that are a priority for restoration and maintenance. The 2012 planning rule also requires all plans to include components to maintain or restore the structure, function, composition, and connectivity of aquatic ecosystems and watersheds in the plan 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. The 2012 planning rule requires that the Forest Service establish best management practices for water quality and that plans ensure implementation of those practices.

Plans are also required to include direction for maintaining and restoring the ecological integrity of riparian areas. The Flathead National Forest proposes to maintain riparian areas by managing riparian habitat conservation areas with desired conditions, objectives, standards, and guidelines. This direction will also protect native fish and further strengthen the conservation watershed network. A conservation watershed network is a collection of watersheds where management emphasizes habitat conservation and restoration to support native fish and other aquatic species.

Watershed Condition Framework

The watershed condition framework (USDA, 2011) will be used to identify priority watersheds, develop watershed action plans, and implement projects to maintain or restore conditions in priority watersheds.

Priority areas for potential restoration activities could change quickly because of events such as wildfire or the introduction of invasive species. Therefore, the 2012 planning rule includes priority watersheds as plan content rather than a plan requirement so that an administrative change to switch to higher-priority watersheds can be used to quickly respond to changes in watershed conditions following a natural disturbance.

Benefits from implementing the watershed condition framework are as follows:

- Strengthens the effectiveness of Forest Service watershed restoration
- Establishes a consistent, comparable, credible process for determining watershed condition class
- Enables a priority-based approach to the allocation of resources for restoration
- Improves Forest Service reporting and tracking of watershed condition
- Enhances coordination with external agencies and partners

The Forest Service Manual 2520, Watershed and Air Management, identifies three classes of watershed condition:

- Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition

- Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition
- Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition

The Forest Service Manual classification defines watershed condition in terms of “geomorphic, hydrologic, and biotic integrity” relative to “potential natural condition.” Geomorphic functionality or integrity can be 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, therefore, the 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
- Class 2 = functioning at risk
- Class 3 = impaired function

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 & 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 its physical attributes are appropriate for maintaining or improving biological integrity. This consideration implies that a class 1 watershed in properly functioning condition has minimal undesirable human impact on its 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 & Niemi, 1990). In contrast, a class 3 watershed has impaired function because a 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 one that has impaired function, 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 Flathead National Forest completed its watershed condition framework in 2011. The Forest identified five class 2 watersheds and 176 class 1 watersheds. No class 3 watersheds were identified. Table E-1 identifies the class 2, or functioning at risk, watersheds and their priorities for restoration. Figure B-01 shows the locations of the class 2 watersheds on the Forest.

Cold and Jim Creeks are the highest priority for restoration because they are important bull trout streams in the Swan River drainage. Beaver, Meadow, and Logan Creeks are predominantly brook trout streams, and although it is desirable to move these watersheds to class 1, it would be a wiser investment to prioritize restoration work in the conservation watershed network that will benefit native fish, as described below.

The watershed condition framework is one component of the Forest's aquatic conservation strategy and is designed to restore watersheds to their natural potential condition. These watersheds require short-term investments to restore them. Another component is the restoration of impaired waterbodies identified on the state 303(d) list for which load allocations and implementation plans have been completed. These watersheds would also require short-term investments. The final component in the strategy is the conservation watershed network, which is a collection of watersheds where management is designed to provide long-term protection and connectivity and enhance the survival of native fish.

Total Maximum Daily Loads

The Montana Water Quality Act requires the Montana Department of Environmental Quality to develop total maximum daily loads (TMDLs) 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 TMDLs to the U.S. Environmental Protection Agency for approval. A TMDL is the maximum amount of a pollutant a waterbody can receive and still meet water quality standards. Developing total maximum daily loads provides an approach to improving water quality so that streams and lakes can support and maintain their state-designated beneficial uses.

An indication of stream habitat quality and water quality on the Flathead National Forest can be derived from the TMDL determination and 303(d) listing process. In 1996, the year after the implementation of the Inland Native Fish Strategy (INFISH) (USDA, 1995), 22 streams on the Forest were listed as impaired due to siltation. During the TMDL development for streams on the Forest from 2004 to 2014, no TMDL was required for 17 of those streams because data collected to support TMDL development indicated that they were no longer impaired for sediment. Thus, these streams were removed from the 303(d) list without the required TMDL. In other words, sediment, which was the leading factor in impairment, was no longer affecting beneficial uses.

On the Flathead National Forest, the Montana Department of Environmental Quality determined that sediment continues to impair aquatic life in Logan, Sheppard, Coal, Goat, and Jim Creeks, and the Department provided sediment TMDLs for those waterbody segments. Therefore, TMDLs have been developed for all streams on the Forest where required. Three waterbodies that are downstream of the Forest boundary, Swan Lake, Haskill Creek, and the Stillwater River, also have sediment TMDLs that have been developed (MTDEQ, 2014). Fish Creek is a recent example of a stream that was on the 1996 303(d) list and remained on the list through 2014 for sediment impairment, but data collected to support TMDL development in 2014 indicated that it is no longer impaired for sediment and will be removed from the 303(d) list (MTDEQ, 2014).

Excess sediment may be limiting the ability of the five streams on the Forest with sediment TMDLs to support aquatic life. Water quality restoration goals for sediment were established on the basis of fine sediment levels in trout spawning areas and aquatic insect habitat, stream morphology and available in-stream habitat as it related to the effects of sediment, and the stability of streambanks. The Montana Department of Environmental Quality believes that once these water quality goals are met, all water uses currently affected by sediment will be restored. The Department's water quality assessment methods for sediment impairment are designed to evaluate the most sensitive use and thus to ensure protection of all

designated uses. For streams in western Montana, the most sensitive use assessed for sediment is aquatic life.

Three of the five impaired streams (Coal, Goat, and Jim Creeks) are important bull trout streams, and Sheppard Creek supports a pure westslope cutthroat trout population that competes with brook trout. Restoration efforts in these watersheds will focus on reducing sediment levels through best management practices for roads and through the reduction of miles of roads within the watersheds.

Table E-1. Watershed condition framework class 2 watersheds on the Flathead National Forest

Current Priority Level	Watershed Name	Attributes Rated at Risk in Watershed Condition Framework Assessment	Current Planning Efforts	Overlapping Priorities and Partnerships
High	Cold Creek	Riparian/wetlands, road density, best management practices, soil productivity	Chilly James; scoped February 2014	Southwest Crown Collaborative Forest Landscape Restoration Program, Bull Trout Conservation Strategy Priority Watershed
High	Jim Creek	303(d)-listed stream, riparian/wetlands, soil productivity, road density, functioning at risk condition class, weeds	Chilly James; scoped February 2014	Southwest Crown Collaborative Forest Landscape Restoration Program, Bull Trout Conservation Strategy Priority Watershed, Swan Total Maximum Daily Load Tech Advisory Group
High	Beaver Creek	Road density, best management practices, weeds, insects and disease, non-native fish	Beaver Creek; proposed action March 2014	Southwest Crown Collaborative Forest Landscape Restoration Program
High	Meadow Creek	Channel morphology, riparian/wetlands, water quality, non-native species	Griffin Creek II; decision December 2013	MFWP
Moderate	Middle Logan	303(d)-listed stream, non-native fish, road density, riparian/wetlands, functioning at risk condition class, water quality	None	MFWP

Conservation Watershed Network for Native Fish

A conservation watershed network is a collection of watersheds where management emphasizes habitat conservation and restoration to support native fish and other aquatic species. The goal of the network is to sustain the integrity of key aquatic habitats to maintain long-term persistence of native aquatic species. Designation of conservation watershed networks, which should include watersheds that are already in good condition or could be restored to good condition, is expected to protect native fish and help maintain healthy watersheds and river systems. See figure B-02 for a map of the Flathead National Forest's conservation watershed network. 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 water during summer dry periods, whereas impaired wetlands are likely less effective at retaining and releasing water over the season. For

all of these reasons, the designation of conservation watershed networks represents the best long-term conservation strategy for native fishes and their habitats.

The headwaters of many watersheds on the Forest that support the healthiest populations of native trout already are protected because they are lands managed as congressionally designated wilderness areas (Bob Marshall, Great Bear, and Mission Mountain Wildernesses) or as wild and scenic rivers. These special places are the building blocks of a conservation watershed network because naturally functioning headwaters have a large influence on the function of downstream stream reaches (Allan, Erickson, & Fay, 1997; Lorenz & Feld, 2013).

Of the native aquatic species present in the plan area, bull trout depend on the largest connected habitat areas, often called habitat patches. The term “habitat patch” as it relates to bull trout is defined by Rieman and McIntyre (1995) as “contiguous stream areas believed suitable for spawning and rearing.” Some potential fish conservation areas may be more challenging to conserve if the habitat patches are small and disconnected, especially considering potential effects of climate change (Dunham, Rieman, & Peterson, 2002; Rieman et al., 2007; Rieman & McIntyre, 1995). This is especially true for bull trout because spawning adults and juveniles depend on large areas of connected stream reaches that have cold water (<11 °C) in late summer months and are often tens of thousands of acres in size.

Bull trout habitat in the western United States is naturally patchy and can be fragmented into smaller, less suitable habitat patches by warming stream reach segments (Daniel J. Isaak, Young, Nagel, Horan, & Groce, 2015). The modeling performed by Isaak and others (2015) assigns a probability of occupancy for bull trout and westslope cutthroat trout based upon cold water habitats (< 11 °C), stream slope, and brook trout prevalence. The model looks at a baseline period from 1970–1999, referred to in the paper as 1980, and then predicts changes to habitat patches for the future periods of 2040 and 2080. Modeled warming is based on 10 global climate change models. McCarthy (2016a) displays the distribution of cold water habitats with occupancy probabilities for bull trout on the Flathead National Forest in 1980 and 2040. McCarthy (2016b) displays the distribution of cold water habitats with occupancy probabilities for westslope cutthroat trout on the Flathead National Forest in 1980 and 2040. Many cold water patches are predicted to exist for both species along the Continental Divide. Many more patches exist for westslope cutthroat trout in the model when compared to bull trout because they persist in smaller patches. In a recently published paper by Isaak and others (2015), the researchers refined predictions for water temperature changes, which affects patch size and probabilities of persistence in 2040. The moderate scenario prediction for 2040 in their 2015 paper is now considered a more extreme prediction and is unlikely to occur until decades later.

Considering studies of patch size and climate effects on patch size, the identification of large habitat patch areas, typically 5th hydrologic unit code watersheds with known stable local populations of bull trout, forms the basis for designating a conservation watershed network for the Flathead National Forest. Because so much of the habitat in the Columbia Headwaters Recovery Unit (USFWS, 2015a) is fragmented by natural barriers as well as by numerous dams constructed for power and water use, a goal in delineating the conservation watershed network is to identify multiple adjacent 5th code watersheds, including watersheds with some risk of damage from the effects of changing climate. Watersheds that would benefit from stormproofing treatments (a strategy to help protect watersheds from climate change discussed in appendix C) are identified in FW-OBJ-CWN-02. Simply stated, the larger a functioning and connected habitat patch is, the greater the chance that cold-water-dependent bull trout and westslope cutthroat trout populations will persist. It’s important to note here that even in smaller habitat patches, standards and guidelines proposed in this forest plan in combination with delineated riparian management zones are expected to maintain and improve existing habitat conditions for these smaller patches, even when not included in the conservation watershed network.

Multi-scale analysis of the Forest's conservation watershed network

A multi-scale analysis was used to develop the Forest's conservation watershed network, starting at the scale of the Columbia River Basin. The best available science indicates the Flathead National Forest is and will be important for the conservation of native fish (bull trout and westslope cutthroat trout) across their range which includes the Columbia River Basin (Daniel J. Isaak et al., 2015; Muhlfeld, McMahon, Boyer, & Gresswell, 2009; Shepard, May, & Urie, 2005; USFWS, 2015a). The Flathead River Basin is located along the spine of the continent and is predicted to provide cold water into the future due to high elevation and slow climate velocities of mountain streams (D. J. Isaak et al., 2016). The Forest then used the climate shield model (Daniel J. Isaak et al., 2015) and temperature model (Jones, Muhlfeld, Marshall, McGlynn, & Kershner, 2014) across the Flathead River Basin (6th hydrologic unit code) to look more closely at where cold water is predicted to persist into the future in the face of climate change. These two models both indicate that cold water is predicted to persist in many of our local bull trout populations that have been identified as priority watersheds under INFISH (USDA, 1995). Therefore, the Flathead National Forest carried over the priority bull trout watersheds and those watersheds designated as critical habitat by the USFWS (75 FR 63898) into the Forest's network.

The Forest also looked at westslope cutthroat trout populations at the subbasin scale (8th hydrologic unit code). There are many pure populations of westslope cutthroat trout on the Forest, unlike many other watersheds across their range where brook trout have either outcompeted them or rainbow trout have hybridized with them. The South Fork of the Flathead River subbasin is unique for its size in that there are no brook trout or rainbow trout populations above Hungry Horse Dam. The large patch size, proximity to each other, and connectivity (at the 10th and 12th hydrologic unit code scale) of these populations makes conservation important because only small fragmented populations exist throughout westslope cutthroat trout range (Rieman & McIntyre, 1995; Shepard et al., 2005).

Lastly, the Forest identified two 12th field hydrologic unit codes in each 8th hydrologic unit code where stormproofing would be targeted in the first decade of the plan. Data on reach scale, barriers, and roads were used to identify priority watersheds for restoration, integrated with terrestrial restoration priorities such as those for grizzly bear. See appendix C for more information and an example of a multi-scale analysis.

The multi-scale analysis conducted by the Forest is consistent with guidance contained in the Interior Columbia Basin Ecosystem Management Project memorandum of understanding (USDA-USDI-EPA-NMFS, 2013) approved by senior managers in several of the western Federal land management and regulatory agencies (i.e., Environmental Protection Agency, National Marine Fisheries Service, USFWS, Bureau of Land Management, and the USFS). The memorandum updates science findings from the original Interior Columbia Basin Ecosystem Management Project effort of the late 1990s and gives guidance for inclusion of best available science in land management plan revisions.

At the broadest of scale considerations, information in the USFWS bull trout recovery plan (USFWS, 2015b) was reviewed to help place habitat and core populations located within the Flathead National Forest in the context of the recovery needs of the species across its range in the western United States. For recovery units such as 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)" (USFWS, 2015b, p. 33). Additional information contained in the *Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout* (USFWS, 2015a) 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. The Flathead River Basin does not have habitat listed as a primary threat, with the exception of Whitefish Lake and Upper Whitefish Lake, primarily on State lands. The primary threats listed throughout the rest of the Flathead River Basin are demographic and invasive species. Hungry Horse core population area does not have any primary threats listed which is a testament to the strength of this population and its habitat. Recovery actions for the Flathead River Basin 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 that actions should be pursued to help provide resilience to “difficult to-manage-threats such as climate change” (USFWS, 2015b).

After reviewing USFWS recovery planning documents, Flathead National Forest biologists examined data related to temperature and the probability of cutthroat and bull trout occurrence collected by Isaak and others (2015) to compare modeled results to known habitat conditions as well as local fish population information. Biologists used bull trout redd count data collected over the past two decades, which can be found in section 3.2.4, subsection “Bull trout,” of the final EIS, to help understand and validate data related to the probability of occurrence of cutthroat and bull trout.

Information from Isaak and others (2010) was also considered in conjunction with PACFISH/INFISH biological opinion (PIBO) monitoring strategy data. PIBO data has been collected on the Flathead National Forest since 2000 and was used to help identify which watersheds considered for inclusion in the watershed conservation network could be prioritized for potential project work to help protect habitat conditions from the effects of climate change. As the list of watersheds identified for inclusion in the conservation watershed network was refined, the *Conservation Strategy for Bull Trout on USFS Lands in Western Montana* (USDA-USFWS, 2013) was reviewed to further identify opportunities to increase the effectiveness of the network. The Northern Region of the Forest Service developed this conservation strategy prior to the release of the USFWS bull trout recovery plan (USFWS, 2015b). Development of this strategy was intended to meet long-term commitments made by the INFISH strategy (USDA, 1995) to implement a long-term restoration strategy for inland native fish. The *Conservation Strategy for Bull Trout on USFS Lands in Western Montana* has the following threefold purpose for the Forest Service and USFWS:

- Provide a standard process for updating bull trout habitat and population baselines that can be documented in the consultation process
- Provide a structured assessment of fish populations and habitat conditions, stressors, and needs
- Identify opportunities that will further guide the location, type, and extent of projects on NFS lands intended to conserve and restore habitat and ultimately contribute to bull trout recovery.

The final step in the conservation watershed network identification process compared watersheds identified for the current plan revision against priority watersheds first identified by INFISH. This step was taken to help ensure important information had not been overlooked by this effort.

Basin and greater scale

The Flathead National Forest does have strong populations of bull trout and westslope cutthroat trout as well as other native species and is expected to provide cold water refugia in the coming century (D. J. Isaak et al., 2016; Daniel J. Isaak et al., 2015; Shepard et al., 2005; USFWS, 2015a, 2015b). The USFWS recovery plan identified some subbasins in the Forest as especially important in the coming century

because the Hungry Horse and Flathead Lake complex core population areas are predicted to maintain some of the coldest habitat to support bull trout in the entire headwaters of the Columbia. The headwaters of the Columbia include the Pend Oreille, Blackfoot, Kootenai, and Clark Fork River Basins as well as the Flathead. At the broadest of scales, habitat on the Forest has been found to be very important for the conservation of cold-water-dependent species like bull trout and westslope cutthroat trout in the western United States.

Subbasin/core area scale

Dropping down in scale and going core area by core area (i.e., Hungry Horse [South Fork of the Flathead], Flathead Lake [North and Middle Forks of the Flathead], and Swan), cold water habitat patches identified by Isaak and others (2015) were compared against bull trout redd survey data and core population areas disclosed in the bull trout recovery plan (USFWS, 2015a, 2015b). The South Fork of the Flathead River subbasin is particularly unique and is the most important subbasin on the Flathead National Forest proposed for inclusion in the conservation watershed network. Two reasons support this assertion. First, Hungry Horse complex core population area is expected to remain one of the coldest core areas, and it does not contain lake trout. Throughout the Flathead River Basin, introduction of lake trout is considered by many as the most important primary threat to native fish. The construction of Hungry Horse Dam in 1953 prevented the spread of non-native lake trout into this drainage (BPA, 2005). Second, the South Fork subbasin contains genetically pure local populations of westslope cutthroat trout. The only non-native species in the Hungry Horse core area is grayling in Handkerchief Lake. Grayling are incapable of interbreeding with native trout and char and do not outcompete native trout.

In addition to Hungry Horse, the Middle and North Fork complex core area (containing two subbasins) and the Swan subbasin also have cold water habitat that is likely to persist in the 21st century. Both core areas also have substantial local populations of spawning migratory bull trout. The USFWS recovery planning documents (USFWS, 2015a, 2015b) consider the presence of substantial lake trout populations as the greatest primary threat to these two core areas. Other primary threats in the other Flathead core areas are fisheries management and the small population sizes in disjunct lakes such as Frozen, Doctor, and Cyclone Lakes. The North and Middle Fork complex core area and the Swan core area are included in the conservation watershed network. In summary, at a subbasin scale, the Flathead National Forest contains three of the most important core areas in the headwaters of the Columbia River, and these areas are expected to help bull trout withstand the potential effects of climate change in the 21st century.

Watershed/subwatershed/local population scale

At the finest scale of consideration, which is watersheds and subwatersheds, the following data sets were used in the multi-scale analysis to identify the conservation watershed network: priority watersheds originally identified by INFISH in 1995, existing spawning assessments for bull trout, Montana Fish, Wildlife and Parks' cutthroat occupancy data, patch size and temperature data contained in Isaak and others' (2015) climate shield model, the *Conservation Strategy for Bull Trout on USFS Lands in Western Montana* (USDA-USFWS, 2013), the *Columbia Headwaters Recovery Unit Implementation Plan* (USFWS, 2015a), and local knowledge of Flathead National Forest biologists and hydrologists. These data sets along with professional opinion were considered at the watershed (5th code) and subwatershed (6th code) scales.

The *Conservation Strategy for Bull Trout on USFS Lands in Western Montana* (USDA-USFWS, 2013) and the *Columbia Headwaters Recovery Unit Implementation Plan* (USFWS, 2015a) provide synopses of factors leading to the decline of bull trout and recommendations for improvements to each local population. In general, there are no complete barriers on Flathead NFS lands that are preventing upstream migration of bull trout into spawning areas, with the exception of Hungry Horse Dam. Habitat restoration

efforts would focus on culvert removals or upsizing of culverts in light of a changing climate to reduce the chance of culvert failure and thus reduce potential sediment inputs into waterbodies. Road storage and possibly segment relocation could be considered to help reduce potential sediment inputs.

For the Hungry Horse complex core area, all watersheds in the South Fork of the Flathead subbasin were identified for inclusion in the conservation watershed network. That is, the entire South Fork of the Flathead subbasin is within the conservation watershed network. The Sullivan and Wounded Buck subwatersheds (12th hydrologic unit code) in the lower South Fork subbasin are identified as the highest priorities for stormproofing on the Flathead National Forest under the conservation watershed network objective in the conservation watershed network section of chapter 2 of the plan.

For the Middle and North Fork complex core area, the following subwatersheds (12th hydrologic unit code) were identified for inclusion in the conservation watershed network: Clack, Strawberry, Bowl, Trail, Morrison, Dolly, Schafer, Granite, Bear, and Long (Middle Fork); and Upper Whale, Lower Whale, Shorty, Read Meadow, Trail, Tuchuck, Upper Coal, Lower Coal, South Fork Upper Coal, Hallowat, Upper Big, and Lower Big Creeks (North Fork). The Trail subwatershed (12th hydrologic unit code) and the Whale Creek watershed (10th hydrologic unit code) in the North Fork of the Flathead subbasin and the Granite and Bear Creek subwatersheds (12th hydrologic unit code) in the Middle Fork of the Flathead subbasin are identified as the next four highest priorities for stormproofing (after Sullivan and Wounded Buck) under the conservation watershed network objective in the conservation watershed network section of chapter 2 of the plan.

The following subwatersheds (12th hydrologic unit code) in the Swan subbasin (8th hydrologic unit code) were identified for inclusion in the conservation watershed network: the Swan River headwaters, Holland Lake, and Elk, Cold, Jim, Piper, Lion, Goat, Woodward, and Lost Creeks. The Goat and Lion Creek subwatersheds (12th hydrologic unit code) are identified as the final priorities for stormproofing (after subwatersheds in the South Fork, Middle Fork, and North Fork of the Flathead subbasins) under the conservation watershed network objective in the conservation watershed network section of chapter 2 of the plan. The Cold and Jim Creek watersheds, in addition to being recommended for inclusion in the watershed conservation network, are listed in the forest plan as priority watersheds for restoration under the watershed condition framework (Potyondy & Geier, 2011; USDA, 2011). In addition to the subwatersheds in the Swan and other subbasins previously discussed, the Stillwater River headwaters and the Swift and Upper Stillwater Lake subwatersheds (12th hydrologic unit code) are identified for inclusion in the conservation watershed network because they contain bull trout critical habitat and disjunct local bull trout populations.

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Appendix F: Scenic Character Descriptions

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Introduction

Scenic character is defined as the combination of the physical, biological, and cultural images that give an area its scenic identity and contribute to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity. (36 CFR 219.19)

Located in the heart of the northern Rocky Mountains and amidst the mountains and valleys of western Montana, the Flathead National Forest is part of a large and intact ecosystem that includes Glacier National Park, several other national forests (Kootenai, Lewis and Clark, Lolo) and other state, federal and tribal lands. The Flathead National Forest is part of the Northern Continental Divide Ecosystem as well as the Crown of the Continent Ecosystem.

Incredible natural features delineate the Forest's boundaries. The North and Middle Forks of the Flathead River and the Continental Divide delineate much of its eastern boundary, and to the west the Forest is bounded by the Mission Mountain Range, Flathead Lake, the Salish Mountains, and the Whitefish Range. The Forest abuts Canada to the north and the Swan Mountain Range and Valley to the south.

Landforms vary greatly, from the magnificent and craggy, rocky, peaks of the Mission Range to the more rounded, glacial landforms of the Swan Valley and Salish Mountains. Diversity in geology, elevation, climate, and annual precipitation results in a wide variety of plant life, from lush groves of cedars cloaked in moss to whitebark pine clinging to the tops of windswept mountain ridges. Dense forests occupy almost 90 percent of the Forest's landscapes, and tree species include Engelmann spruce, subalpine fir, lodgepole pine, Douglas-fir, and western larch. Green pockets of maple, willow, and birch are scattered across the northern edge of the Bob Marshall Wilderness, and traces of grand fir, western white pine, ponderosa pine, and aspen occur across the Forest. Outstanding multi-colored displays of wildflowers in the alpine meadows and high basins are evident in late summer. Dominant scenery attributes are open, park-like conifer and mixed-conifer forest settings dominated by large trees with diverse forest canopy and mosaic vegetative patterns, including vivid fall stands of cottonwoods and aspen groves.

Elevations generally range from 3,000 to 9,500 feet. The tree line is generally up to 8,000 feet, where it gives way to alpine vegetation. Waterbodies are abundant, including rivers, streams, lakes, reservoirs, glacial potholes, fens, and bogs. Mean annual precipitation ranges from 20 to 60 inches. Streams flow into the Swan, Stillwater, and the three forks of the world-renowned Flathead River headwaters. These drainages are moderately to deeply incised. They eventually flow into Flathead Lake, the largest freshwater lake west of the Great Lakes. Many other lakes occur in glaciated terrain and at higher elevations. The abundance of water in this landscape adds to the richness of the scenery. Several large and small crystal-clear lakes and lush wetland areas are scattered throughout the Forest, creating thick pockets of vegetation and picturesque landscapes. These distinctive Flathead National Forest landscapes include a variety of landforms, water features, and vegetation and are highly scenic. Research shows that people prefer more visually complex scenes compared to more monotonous ones (Ryan, 2005).

Cultural features are evident across the Forest. These include log cabins and remnants of early Euro-American settlements, Forest Service ranger stations and fire lookouts, and Native American travel routes and cultural sites. Many of the structures, trails, and sites have retained their historic integrity and add to the area's character and sense of place.

Geographic Area Scenic Character

North Fork Geographic Area



Figure F-1. Open stand of ponderosa pine in the North Fork geographic area

The North Fork geographic area lies in the northernmost portion of the forest adjacent to the Canadian border. The North Fork of the Flathead River separates the forest from Glacier National Park and delineates the area's eastern boundary. Whitefish Mountain Resort, Montana state lands, and the Kootenai National Forest form the area's western boundary, and the geographic area terminates to the south in the North Fork Valley bottom.

Lying west of the Continental Divide, the high-elevation areas of the North Fork geographic area trap precipitation coming from the Pacific. The majority of the geographic area is blanketed by subalpine fir, Douglas-fir, grand fir, and Engelmann spruce forests, with pockets of ponderosa (figure F-1). Steep, jagged, and glaciated mountains characterize higher elevations that extend into Canada. The rocky soils, talus slopes, and rock outcrops of these higher elevation landscapes support alpine-subalpine vegetation. Whitebark pine is commonly found along mountain ridges. The visually stunning North Fork River corridor and its many tributaries, including Yakinikak, Trail, and Nokio Creeks, create strings of riparian vegetation that dissect the landscape. Glacier National Park's snowcapped mountains set a dramatic backdrop image along the river.

Significant wetland complexes occupy lower elevations and support unique plants communities in the Mud Lake, Teepee Lake, and Hay Creek wetland complexes. The Tuchuck area supports a unique pocket of subalpine larch and fir. The vegetation's diversity of rich colors from dark greens to contrasting seasonal yellows, covers the river's edge and mountain slopes.

Cultural features are rich throughout this geographic area and include multiple homesteads, work centers, ranger stations, and fire lookouts from the early 1900s. Their rustic character has largely been preserved. These cultural features include the Big Creek Work Center; the Wurtz Homestead; Hornet Peak, Coal Ridge, and Thoma Lookouts; Ford Ranger Station; the Funk Schoolhouse; and Ninko, Schnaus, and Ben Rover cabins. The small community of Polebridge, particularly the Polebridge Mercantile and the Northern Lights Saloon, has long been a destination for visitors to the area, offering modern-day conveniences in a setting that reflects the ambiance of what early settlers experienced.

Hungry Horse Geographic Area

Located south and west of Glacier National Park, this geographic area lies west of the Continental Divide and is affected by moist Pacific maritime air masses. The high, rugged, glaciated mountains are characterized and differentiated from lower areas by heavy precipitation, active glaciers, thick winter snow pack, a very short growing season, numerous bodies of flat water, and mixed high elevation climax vegetation. A variety of rock underlies the ecoregion, and colluvium, talus, and rock outcrops are common. Lower elevations support subalpine fir, Douglas-fir, grand fir, and Engelmann spruce forests. Pockets of aspen and larch, create vibrant fall color.

A prominent landscape feature of the Hungry Horse geographic area is the 34-mile-long Hungry Horse reservoir, tucked between the dramatic Flathead and Swan Mountain Ranges. The west side of the reservoir is rich with vegetation and largely covered by subalpine fir, Douglas-fir, grand fir, and Engelmann spruce forests.

Dozens of lakes lie in the rocky folds of Jewel Basin Hiking Area. The South Fork of the Flathead River, Aeneas Creek, and dozens of other streams and creeks dissect the vast and rugged landscape and are bordered with lush riparian vegetation.

Aside from the iconic Hungry Horse Reservoir and Dam, there are several other cultural features that add to the scenic character of the geographic area. The Spotted Bear Ranger Station, Firefighter Lookout, Baptiste Lookout, and many miles of Native American travel corridors with unique prehistoric/archaeological sites occur throughout the area.

Middle Fork Flathead Geographic Area

The Middle Fork geographic area lies on the east side of the Continental Divide and south of Glacier National Park. The landscapes of the Middle Fork range from steep and rugged terrain that is punctuated with large rock outcroppings to glaciated moraines and U-shaped valleys. The Middle Fork of the Flathead River and its many tributaries create bands of riparian vegetation that traverse the landscape. The Nyack Flats floodplain, numerous pothole lakes, and other large wetlands create islands of lush and unusual vegetation. Along the river, pristine waters are a dramatic focal point within the changing steep canyons. These cascading waters rush through jagged rocks and cut deep picturesque pools. Dark blue to turquoise waters contrast against the white foam. Thick vegetation blankets the canyon walls with green, contrasting with the barren cutbanks and sandbars of the river. Distant peaks are continually concealed by adjacent valley slopes from different canyon views. A variety in vegetation shows season color change and increases the texture and patterns in the landscape. Fall views are dominated for a few weeks by flashes of yellow larch conifers. Climax vegetation within the geographic area is subalpine fir and Douglas-fir forest.

Cultural features include the Northern-Santa Fe railroad line (figure F-2); decades-old bridges, the Schafer Ranger Station and airstrip; and Granite, Spruce Park, Pentagon, Gooseberry, and Sabido cabins.



Figure F-2. Passenger train crossing a bridge over the Middle Fork of the Flathead River

South Fork Flathead Geographic Area

This geographic area is within the Swan Mountains and comprises the heart of the South Fork of the Flathead River. Its eastern boundary, the Continental Divide, forms the division between the Flathead and Lewis and Clark National Forests. Winding along 12 miles of this divide, the 1,000-foot-high limestone escarpment known as the Chinese Wall is a significant geological feature.

The South Fork of the Flathead River and several other significant rivers and creeks such as Spotted Bear, Little Salmon Creek, Big Salmon Creek, Danaher Creek, and the White River add variety and interest to the landscape. Bent Flat and Trail Creek are significant fens along the Spotted Bear River and harbor several rare wetland plant species. Clear rushing water is the focal point of the conifer-covered canyon. Along the river bottom, rugged rock outcrops frame deep blue pools of water that contrasts with the white foam in faster-moving water. Seasonal color changes are dramatic. Barren and rocky river banks and sandbars line the water's edge. Narrow rock canyons are dramatic features at a few locations. Distant peaks rise high into the sky, providing a spectacular backdrop to the river below.

Cultural features include the Spotted Bear and Big Prairie Ranger Stations; Black Bear, Salmon Forks, Basin, Danaher, Shaw, Pendant Cabins; Silvertip Cabin and related trails and pack bridges; and a historic backcountry administrative phone line stretching 44 miles between Black Bear and Danaher Cabins. Airstrips at Big Prairie, Meadow Creek, and Spotted Bear are also cultural features that remain functional today. Trees scarred by Native Americans are evident in Murphy Flats and White River Park.

Salish Mountains Geographic Area

This geographic area encompasses the western reaches of the Forest. The glaciated landscape is bound by the Salish Mountains to the west and stretches to the Flathead Valley. The Whitefish Divide traverses the geographic area. Elevations range from 2,500 to 7,600 feet. The rolling topography supports Douglas-fir and Western ponderosa forests. The Le Beau and Little Bitterroot areas, as well as Johnson Terrace, create unique topographic features that harbor unique islands of plant diversity amidst a forested landscape. Grassy foothills form the transition between the Salish Mountains and valley landscapes.

Lower-lying areas are a mix of forested and non-forested landscapes. Forested areas are often dominated by western larch, Douglas-fir, or Engelmann spruce, showing pockets of fall color. Large lakes, including Tally, Little Bitterroot, Upper and Lower Stillwater, Ashley, and Whitefish Lakes, punctuate the broad, open valley with rings of riparian vegetation. Significant wetland complexes exhibit diverse plants and features. Long strings of wetlands and ponds occur along the eastern portion of the geographic area. Other significant water features include the headwaters of Sheppard and Good Creeks; Haskill Creek, Le Beau and Logan Creeks, and Hellroaring Creek. Cultural features include the Star Meadows Ranger Station, the Elk Mountain Patrol Cabin, and small-scale scattered historic mining remains.

Swan Valley Geographic Area

West of the Continental Divide, this geographic area is characterized by the outstanding scenic beauty of the rocky and rugged snowcapped peaks of the Mission Mountains, which are in stark contrast to the more sheltered and gently sloped lush green floor of the Swan Valley. The Mission Mountains contain subalpine fir, Douglas-fir, grand fir, and Engelmann spruce forests. Elevations range from 3,000 to 9,000 feet. Vertical cliffs, flat, slab-like boulders, and talus slopes are abundant. The valley floor is interrupted by lakes, such as Swan, Holland, and Lindbergh Lakes. Several smaller glaciers, alpine lakes, meadows, and clear cold streams are hidden by terrain and vegetation (figure F-3). Gravelly and droughty soils support Douglas-fir or Engelmann spruce climax forests, and moister, finer-textured soils support Engelmann spruce or subalpine fir climax forests. A variety of vegetation shows seasonal color change and increases the texture and patterns in the landscape. The valley floor also contains extensive fens (peatlands), creating pockets of diverse flora and rare aquatic habitats. Outstanding multi-colored displays of wildflowers in the alpine meadows and high basins are evident in late summer.

Historic 1930s ranger stations (Swan and Old Condon), Holland Lookout, and the newer Condon Ranger Station and Swan Eco-Center add cultural interest and variety to the area. In addition, scarred trees from Native American occupation add to the scenic character and heritage of the area.

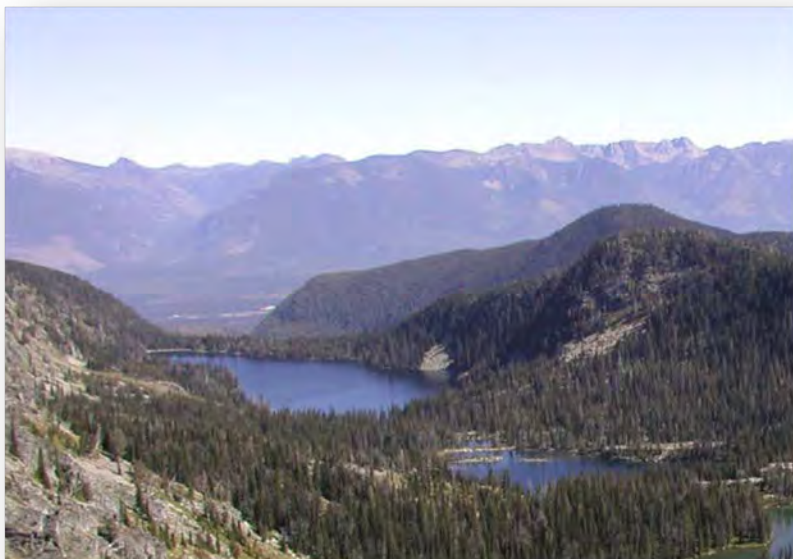


Figure F-3. View of the Swan mountain range in distance with Crescent, Heart, and Island Lakes in foreground

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Appendix G: Factors for Wilderness Recommendation Areas

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Introduction

The following tables summarize information for each recommended wilderness area, as required in Forest Service Handbook 1909.12 chapter 70 section 73 Analysis. This information is also available in appendix 4 of the final EIS. Because some plan components for recommended wilderness areas reference both wilderness characteristics as well as the ecological and social characteristics that would provide the basis for each recommended wilderness area's suitability for inclusion in the National Wilderness Preservation System, this information has been included in this appendix to the forest plan. This information is necessary in implementing the applicable plan components and is also helpful in determining consistency with plan components during project-level analysis. The following factors are identified for each recommended wilderness area:

- the name of the area and the number of acres to be considered;
- the location and a summarized description of a recommended boundary;
- a brief description of the general geography, topography, and vegetation;
- a brief description of the current uses and management of the area;
- a description of the area's *wilderness characteristics* and the ability of the Forest to protect and manage the area so as to preserve its wilderness characteristics;
- a brief summary of the factors considered and the process used in evaluating the area and developing the alternatives; and
- a brief *summary of the ecological and social characteristics* that would provide the basis for the area's suitability for inclusion in the National Wilderness Preservation System.

See figure 1-65 for a map of the recommended wilderness areas in alternative B modified.

Alcove-Bunker Recommended Wilderness Area

This recommended wilderness was derived from the Bob North wilderness inventory area.

Table G-1. Alcove-Bunker recommended wilderness area

Factors	Description
1. Acres	18,901 acres
2. Summarized description of the recommended boundary	<p>This area is within the Bunker Creek drainage, north of the existing Bob Marshall Wilderness. The area is split into three parts. The buffered trails #91 and #101, and NFS Road 549 bisect the middle and the northwestern parts of the area. The buffers vary in width depending on terrain. . The trail and road corridors allow for mechanized transport and connect with Trails #31 and #108. The three parts of the area are:</p> <ul style="list-style-type: none"> ○ The eastern part—The southern boundary follows the existing Bob Marshall Wilderness boundary until Gorge Creek. The western boundary is the Gorge Creek trailhead. The eastern boundary is Picture Ridge Trail #107. Bunker Creek forms the northern boundary, which is south of NFS Road 549. ○ The middle part—The southern boundary follows the existing Bob Marshall Wilderness boundary; the western boundary follows the divide between the South Fork drainage and the Swan River drainage, at the intersections of Trails #31 and #91. The eastern boundary is the Gorge Creek trailhead. The northern boundary is made up of portions of NFS Road 549 and Trail #101 and portions of Trail #91.

Factors	Description
	<ul style="list-style-type: none"> The northwestern part—The western boundary is Trail #7 (this trail is not included in the recommended wilderness area). The northeastern boundary is Trails #101 and #101a (these trails are not included in the recommended wilderness area). The southern boundary is Trail #91 (this trail is not within the recommended wilderness area; the boundary is offset to the interior of the trail in areas where there are historical or existing roads and flat ground).
3. Brief description of the general geography, topography, and vegetation	Much of the area is moderately steep to very steep, with some gentle slopes, and ranges from heavily timbered to subalpine land forms. Existing vegetation includes whitebark pine, subalpine fir, Douglas-fir, lodgepole pine, and western larch. The highest point in this area is Alcove Mountain at 8,053 feet.
4. Current uses and management	The 1986 forest plan direction is primarily for managed lands within grizzly bear habitat. About 53 percent of this area consists of the 1986 forest plan's Alcove recommended wilderness, and 94 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The two primary summer and winter recreation opportunity spectrum classes are primitive and semiprimitive nonmotorized. This area has 2.4 miles of nonmotorized trail.
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. Most of this area has intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention.</p> <p>Undeveloped quality—The majority of this area is undeveloped and not affected by human intervention. This area has 2.4 miles of nonmotorized trails are along the boundary.</p> <p>Unconfined and/or primitive recreation—This area has an outstanding amount of unconfined and primitive recreation opportunities: horseback riding, hiking, backpacking, fishing, hunting, wildlife viewing, gathering forest products, snowshoeing, and cross-country skiing.</p> <p>Solitude—There is outstanding opportunity for solitude as the sights and sounds of human activities and improvements are screened by topography or do not have impact due to distance; this area is very remote.</p> <p>Other features of value—None.</p> <p>The Forest's ability to protect and manage these wilderness characteristics is very high as this area is remote, has little development, 94 percent of the area is within an inventoried roadless area, and the southern boundary is adjacent to the Bob Marshall Wilderness. A large portion (53 percent) of this area has been managed as recommended wilderness since the 1986 forest plan. Trail #91, which allows mechanized transport, bisects two of the three areas of the recommended wilderness area, and this might pose management challenges.</p>
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternatives	<ul style="list-style-type: none"> High interest exists for this area to be recommended for wilderness. In addition, there is public interest in recommending all inventoried roadless areas as wilderness. This area is adjacent to the Bob Marshall Wilderness and would expand it by 18,901 acres. A portion (53 percent) of this area contains the 1986 forest plan's Alcove recommended wilderness. This area has critical habitat for Canada lynx, but the quality has been affected by recent stand-replacing wildfires. When stand-replacing wildfires burn in lynx habitat, it becomes temporarily

Factors	Description
	<p>unsuitable until dense shrubs and/or small trees grow back (ILBT, 2013). This area has very high quality grizzly bear habitat, a very high amount of maternal denning habitat for wolverines, and high-quality habitat for mountain goats.</p> <ul style="list-style-type: none"> ○ Bull trout and westslope cutthroat trout are present in Bunker Creek, which is designated as bull trout critical habitat. ○ This area represents an opportunity to add 1,621 acres of underrepresented ecological groups to the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ the naturalness of the area is very high because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as the grizzly bear, wolverine, lynx, mountain goat, bull trout, and westslope trout; and ○ the undeveloped quality of the area is very high because the majority of this area is unroaded (97%), although there are 2.4 miles of nonmotorized trail. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ the area offers outstanding opportunities for solitude; and ○ there is a high amount of primitive and/or unconfined recreation for hunting, horseback riding, fishing, hiking, cross-country skiing, and wildlife viewing.

Elk Creek Recommended Wilderness Area

This recommended wilderness area is derived from the Elk Creek wilderness inventory area.

Table G-2. Elk Creek recommended wilderness area

Factors	Description
1. Acres	1,442 acres
2. Summarized description of the recommended boundary	The western and southern boundaries are the existing Mission Mountains Wilderness. The northern boundary is along Elk Creek; the eastern boundary follows a section line.
3. Brief description of the general geography, topography, and vegetation	Existing vegetation includes lodgepole pine, Douglas-fir, western larch, and subalpine fir. This area has moderate slopes and is heavily timbered. Although no mountaintop is located in the area, the highest ridge point is about 6,800 feet and is the highest point in the area.
4. Current uses and management	The 1986 forest plan primary direction is timber production. The primary summer and winter recreation opportunity spectrum class is semiprimitive nonmotorized.
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention. There is a large, visible, older dozer firebreak along the ridge in the southern portion that has been rehabilitated.</p> <p>Undeveloped quality—The majority of this area is undeveloped and not affected by human intervention. This area has 2.4 miles of nonmotorized trails.</p>

Factors	Description
	<p>Unconfined and/or primitive recreation—This area has an outstanding amount of unconfined and primitive recreation opportunities: fishing, paddling, hiking, backpacking, snowshoeing, and backcountry skiing.</p> <p>Solitude—The area is remote, and the majority of this area provides outstanding opportunities for solitude. Because much of the area has moderately steep slopes and is heavily timbered, sights and sounds are buffered, which provides opportunities for solitude.</p> <p>Other features of value—Elk Creek is the most productive stream for the threatened bull trout in the Swan River watershed.</p> <p>The Forest's ability to protect and manage these wilderness characteristics is very high. This area is adjacent to the Mission Mountains Wilderness. The eastern boundary may pose a challenge to managers as it follows section lines and is not generally based on natural features that are locatable on the map or on the ground.</p>
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> There is public interest in recommended wilderness areas adjacent to the Mission Mountains Wilderness and within inventoried roadless areas. This area is adjacent to the Mission Mountains Wilderness and would expand it by 1,442 acres. This area is important to Canada lynx and wolverine (high quality and/or high amounts of habitat). Elk Creek is the most productive stream for the threatened bull trout in the entire Swan River watershed and is an eligible wild and scenic river with the outstandingly remarkable value for fish. This area represents an opportunity to add 1,197 acres of underrepresented ecological groups to the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> The naturalness of the area; much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as grizzly bear, wolverine, lynx, bull trout, and westslope cutthroat trout. Elk Creek is the most productive stream for the threatened bull trout in the Swan River watershed and is an eligible wild and scenic river with the outstandingly remarkable value for fish; and the undeveloped quality of the area is very high because this area is unroaded and has no trails within it. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> outstanding opportunities for solitude and primitive and/or unconfined recreation such as fishing, paddling, hiking, backpacking, snowshoeing, and backcountry skiing.

Java-Bear Creek Recommended Wilderness Area

This recommended wilderness area is derived from the Essex wilderness inventory area.

Table G-3. Java-Bear Creek recommended wilderness area

Factors	Description
1. Acres	1,824 acres

Factors	Description
2. Summarized description of the recommended boundary	<p>This recommended wilderness area is separated into two parts, both of which are adjacent to the existing Great Bear Wilderness. The area is a thin strip of land that ranges from 0.1 to 0.5 mile from the existing wilderness, and it generally heads southeast towards the U.S. Highway 2 corridor.</p> <ul style="list-style-type: none"> ○ Western part: The southwestern boundary is adjacent to the Great Bear Wilderness and ranges from 0.1 to 0.5 mile from the existing wilderness boundary. The eastern boundary follows Trail #152/62 Sheep-Elk Loop and the Logan Dirty Face Trail #62. This area is west of the Middle Fork of the Flathead River. ○ Eastern part: The western and southern boundaries are adjacent to the Great Bear Wilderness. This area is east of the Middle Fork of the Flathead River and south of Bear Creek and U.S. Highway 2. The northern boundary ranges from 0.1 to 0.5 mile from existing designated wilderness. No discernible features define the northern boundary, but it typically is at least 0.25 mile south of U.S. Highway 2.
3. Brief description of the general geography, topography, and vegetation	<p>Existing vegetation includes Douglas-fir, lodgepole pine, subalpine fir, and western larch. In higher elevations, there is sparse vegetation. The slopes are very steep and heavily timbered, with the highest elevation in the area at 6,800 feet.</p>
4. Current uses and management	<p>The 1986 forest plan primary direction is unroaded lands suitable for dispersed recreation that meets the recreation opportunity spectrum class of semiprimitive nonmotorized. About 91 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The primary summer recreation opportunity spectrum class is semiprimitive nonmotorized, and the primary winter recreation opportunity spectrum class is semiprimitive nonmotorized.</p> <p>This area has 1.8 miles of nonmotorized trails; 1.3 miles allow mechanized transport.</p>
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention.</p> <p>Undeveloped quality—The majority of this area is undeveloped and not affected by human intervention. This area has 1.8 miles of nonmotorized trail; 1.3 miles allows mechanized transport.</p> <p>Unconfined and/or primitive recreation—Opportunities for hiking, backpacking, horseback riding, fishing, hunting, cross-country skiing, and backcountry skiing.</p> <p>Solitude—Depending on how close one is to the U.S. Highway 2 corridor, opportunities for solitude can range from moderate close to the corridor to very high as one travels away from the corridor.</p> <p>Other features of value —None.</p> <p>The Forest's ability to protect and manage these wilderness characteristics is high. This area is adjacent to the Great Bear Wilderness, and about 91 percent of this area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The current boundary may pose a challenge to managers as portions of the boundaries not adjacent to the Great Bear Wilderness generally are not based on natural features that are locatable on the map or on the ground.</p>

Factors	Description
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> There is public interest in recommended wilderness areas adjacent to existing designated wilderness and within inventoried roadless areas. This area is adjacent to the Great Bear Wilderness and would increase it by 1,824 acres. The area includes high habitat for wolverines, mountain goats, and grizzly bear and contributes to connectivity in a key area. Bull trout are in Bear Creek and westslope cutthroat trout are in Bear, Devil, and Sheep Creeks. The eastern area has high values for connectivity between Glacier National Park and the Forest for wolverines, mountain goats, grizzly bear, and lynx. This area represents an opportunity to add 372 acres of underrepresented ecosystems to the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> Naturalness of the area as much of the area is affected primarily by natural forces, has mostly intact ecological integrity and contains many indigenous species such as the grizzly bear, mountain goat, wolverine and bull trout. Undeveloped quality of the area is very high as this area is unroaded with 1.3 miles of nonmotorized trails. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> primitive and/or unconfined recreation for hunting, horseback riding, fishing, hiking and wildlife viewing; and portions of this area have very high opportunities for solitude, although closer to the U.S. Highway 2 corridor, the opportunity for solitude is moderate.

Jewel Basin Recommended Wilderness Area

This recommended wilderness area is derived from the Hungry Horse West wilderness inventory area.

Table G-4. Jewel Basin recommended wilderness area

Factors	Description
1. Acres	18,462 acres
2. Summarized description of the recommended boundary	Generally the western boundary follows the Swan Crest and extends downslope of the crest in the Birch Lake area. The southern boundary at the southernmost point at Broken Lake Mountain, the boundary continues towards the divide between Wheeler and Quintonkon Creek. The southern boundary is along Trail #64 to junction of Trail #7 and follows the Jewel Basin Hiking Area boundary and then follows Trail #7 south. The eastern boundary meanders between the ridge between Biglow Creek and Kate Creek towards Graves Creek and then follows the Jewel Basin Hiking Area.
3. Brief description of the general geography, topography, and vegetation	Existing vegetation includes Douglas-fir, subalpine fir, western larch, whitebark pine, and lodgepole pine. Gentle to very steep slopes. Some timbered slopes with rocky slopes and outcrops, avalanche chutes, and high alpine lakes. Big Hawk Mountain at 7,542 feet is the highest point in this area.

Factors	Description
4. Current uses and management	<p>The 1986 forest plan direction is the Jewel Basin Hiking Area and unroaded lands suitable for dispersed recreation that meets the recreation opportunity spectrum class of semiprimitive nonmotorized. About 95 percent of this area is the 1986 Jewel Basin recommended wilderness area. About 98 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The primary summer and winter recreation opportunity spectrum class is primitive.</p> <p>This area contains 37 mile of nonmotorized trails. There are 0.8 miles of historical roads that are no longer on the road system within this area.</p>
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention.</p> <p>Undeveloped quality—The majority of this area is undeveloped and not affected by human intervention. This area has 43 miles of nonmotorized trails.</p> <p>Unconfined and/or primitive recreation—Outstanding opportunities exist for primitive recreation included hiking, backpacking, horseback riding, hunting, fishing, gathering forest products, snowshoeing, and cross-country and backcountry skiing.</p> <p>Solitude—There is very high opportunity for solitude in this area although mainline trails within the Jewel Basin Hiking Area have high levels of use on weekends and holidays.</p> <p>Other features of value—None.</p> <p>The Forest's ability to protect and manage these wilderness characteristics is very high. About 94 percent of this area is the 1986 Jewel Basin recommended wilderness area, and about 98 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. Generally, boundaries follow natural features that are locatable on the map or on the ground.</p>
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> ○ There is high public interest in this area remaining recommended wilderness. ○ A majority (95 percent) of this area was recommended wilderness in the 1986 forest plan. Eighty-three percent of this area contains the Jewel Basin Hiking Area. ○ This area has a high percentage of maternal habitat for wolverine and contributes to habitat connectivity for wolverine, grizzly bear, and lynx as well as a to continuous band of high-quality habitat mountain goats habitat that occurs from above Margaret Lake westward to Big Hawk Mountain in the Jewel Basin Hiking Area. ○ Aeneas Creek, which flows through the area, is an eligible wild and scenic river. ○ There is a high concentration of alpine lakes that support genetically pure westslope cutthroat trout. ○ This area represents an opportunity to add 6,586 acres of underrepresented ecological groups to the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ the naturalness of the area, because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and

Factors	Description
National Wilderness Preservation System	<p>contains many indigenous species such as the grizzly bear, lynx, wolverine, mountain goat, and westslope cutthroat trout; and</p> <ul style="list-style-type: none"> the undeveloped quality of the area is high because this area is unroaded with very limited developments. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> very high opportunities for solitude away from mainline trails in the Jewel Basin Hiking Area, and primitive and/or unconfined recreation for hunting, horseback riding, fishing, hiking, and wildlife viewing.

Limestone-Dean Ridge Recommended Wilderness Area

This recommended wilderness area is derived from the Bob North wilderness inventory area.

Table G-5. Limestone-Dean Ridge recommended wilderness area

Factors	Description
1. Acres	15,026 acres
2. Summarized description of the recommended boundary	<p>The northern and eastern boundaries are the Great Bear Wilderness, and the southern boundary is the Bob Marshall Wilderness. Spotted Bear River NFS Road 568 bisects the main lobe; this buffered road corridor is excluded from the area. The western upper boundary is bordered by Road 564 and Whitcomb Creek. This area generally follows the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485.</p> <p>The southern boundary is adjacent to the Bob Marshall Wilderness, and the western boundary follows the ridge line from Spotted Bear Mountain to 0.5 mile from the Spotted Bear River. The boundary then heads east, going upstream of the Spotted Bear River. The southeast boundary crosses the Spotted Bear River just upstream of Blue Lakes.</p>
3. Brief description of the general geography, topography, and vegetation	<p>Much of the area is moderately steep to very steep and ranges from heavily timbered to subalpine landforms to open south-facing slopes. Existing vegetation includes subalpine fir, Douglas-fir, lodgepole pine, whitebark pine, and western larch. The highest point in the area is Whitcomb Peak at 7,306 feet. This area has a network of limestone caves near Sergeant Mountain and Spotted Bear Mountain.</p>
4. Current uses and management	<p>The 1986 forest plan direction is primarily unroaded lands suitable for dispersed recreation that meets the recreation opportunity spectrum of primitive class. About 35 percent of this area contains the 1986 forest plan's Limestone Cave recommended wilderness area. Approximately 99 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The primary summer and winter recreation opportunity spectrum class is semiprimitive nonmotorized. The area has 10 miles of nonmotorized trails; 8 miles allow mechanized transport.</p>
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention.</p> <p>Undeveloped quality—The majority of this area is undeveloped and not affected by human intervention. This area has 10 miles of nonmotorized trails; 8 miles allow mechanized transport.</p> <p>Unconfined and/or primitive recreation—Outstanding opportunities for primitive recreation activities in this area include horseback riding, hiking, backpacking, fishing, hunting, wildlife viewing, and cross-country skiing.</p>

Factors	Description
	<p>Solitude—This area provides outstanding opportunities for solitude. With much of the area moderately steep to very steep and ranging from heavily timbered to subalpine land forms, sights and sounds are buffered, which allows for solitude.</p> <p>Other features of value —A network of limestone caves has had ongoing exploration for many years and provides scientific and educational value. Whitebark pine trees with apparent natural resistance to blister rust occur within the upper reaches of Big Bill Creek and provide seed for whitebark pine restoration programs.</p> <p>The Forest's ability to protect and manage these wilderness characteristics is very high. About 19 percent of this area contains the 1986 forest plan Limestone Cave recommended wilderness, and this area is 99 percent within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The northern, eastern, and southern boundaries are adjacent to existing wilderness and use natural features that are locatable on the map or on the ground.</p>
<p>6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)</p>	<ul style="list-style-type: none"> ○ There is public interest in recommended wilderness areas adjacent to existing designated wilderness and within inventoried roadless areas. ○ A portion (19 percent) of this area contains the 1986 forest plan Limestone Cave recommended wilderness area. ○ This area is adjacent to the Great Bear and Bob Marshall Wildernesses and expands the Bob Marshall Wilderness Complex by 15,026 acres. ○ This area is key habitat for Clark's nutcracker. ○ There are strong populations of bull trout in Spotted Bear River (bull trout critical habitat) and tributaries, as well as genetically pure westslope cutthroat trout in many streams throughout this area. ○ There is high and very high quality lynx habitat, and there is mountain goat habitat in this area. ○ A portion of this area has maternal denning habitat for wolverine, and a majority of the area contains high or very high quality grizzly bear habitat. ○ This area includes a portion of the Spotted Bear River, which is an eligible wild and scenic river. ○ This area represents an opportunity to add 1,352 acres of underrepresented ecological groups to the National Wilderness Preservation System.
<p>7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System</p>	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ the naturalness of the area, because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as the grizzly bear, lynx, wolverine, mountain goats, bull trout, and westslope cutthroat trout; and ○ the undeveloped quality of the area is high because this area is unroaded, has little development, and has 10 miles of nonmotorized trails. Unique ecological features and the network of limestone caves, which has had ongoing exploration for many years, provides scientific and educational value. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ primitive and/or unconfined recreation for horseback riding, hiking, backpacking, fishing, hunting, wildlife viewing, and cross-country skiing; and ○ outstanding opportunities for solitude.

Slippery Bill-Puzzle Recommended Wilderness Area

This recommended wilderness area is derived from the Puzzle wilderness inventory area.

Table G-6. Slippery Bill recommended wilderness area

Factors	Description
1. Acres	12,393 acres
2. Summarized description of the recommended boundary	The southern boundary is the Great Bear Wilderness, and the eastern boundary is the Continental Divide, which is also the administrative boundary between the Flathead National Forest and the Helena-Lewis and Clark National Forest. The northern boundary starts at the Continental Divide at Trail #251 and follows the trail south until NFS Road 569G. The boundary follows NFS Road 569.1 south to the end of the road and then heads north to Road 569G. NFS Road 569.1 is buffered and excluded from the recommended wilderness area. The northern boundary continues west towards the Morrison Creek trailhead (the trailhead is not within the recommended wilderness area) and then traverses southwest of the roaded portion to the boundary of the Great Bear Wilderness area.
3. Brief description of the general geography, topography, and vegetation	Existing vegetation includes whitebark pine, lodgepole pine, and subalpine fir. The area is moderately to heavily timbered and has gentle to steep slopes. Bullshoe Mountain at 8,000 feet is the highest point in the area.
4. Current uses and management	The 1986 forest plan primary management direction is unroaded lands suitable for dispersed recreation that meets the recreation opportunity spectrum class of semiprimitive nonmotorized. About 43 percent of this area is the 1986 forest plan's Slippery Bill recommended wilderness area. About 98 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The primary summer and winter recreation opportunity spectrum class is semiprimitive nonmotorized. The area has 4 miles of nonmotorized trails that allow mechanized transport and 344 acres of motorized over-snow vehicle use.
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	Natural quality —The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention. Undeveloped quality —The majority of this area is undeveloped and not affected by human intervention. This area has 4 miles of nonmotorized trails. The Patrol Ridge electronic site may be moved to this area. Unconfined and/or primitive recreation —Opportunities include hiking, backpacking, horseback riding, hunting, fishing, forest product gathering, and cross-country and backcountry skiing. Solitude —About 98 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485, which makes for outstanding opportunities for solitude. The area provides solitude and remoteness near the Continental Divide. Morrison and Granite are two mainline trails that traverse through the area and have high use. Other features of value —None. The Forest's ability to protect and manage these wilderness characteristics is very high. About 98 percent of this area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485, and about 43 percent of this area contains the 1986 forest plan's Slippery Bill recommended wilderness area. The northern boundary may pose a

Factors	Description
	challenge to managers as it generally is not based on natural features that are locatable on the map or on the ground.
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> There is public interest in recommended wilderness areas adjacent to existing designated wilderness and within inventoried roadless areas. A portion (43 percent) of this area contains the 1986 forest plan's Slippery Bill recommended wilderness area. This area is adjacent to the Great Bear Wilderness and expands it by 12,393 acres. The southern portion (the area around Crescent Cliff) is mountain goat habitat. This majority of this area provides high-quality grizzly bear habitat and contains maternal denning habitat for wolverine. The area has high and very high quality lynx habitat. Area contributes to connectivity for wildlife in a key area, but connectivity has been negatively affected by recent stand-replacing wildfires. Granite, Morrison, and Twenty-Five Mile Creeks support bull trout and native westslope cutthroat trout. Granite and Morrison Creeks are designated as bull trout critical habitat. The area contains 120 acres of underrepresented ecological groups within the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> the naturalness of the area because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as the grizzly bear, lynx, wolverine, mountain goat, bull trout, and western cutthroat trout; and the undeveloped quality of the area is very high because the majority of this area is unroaded (98 percent) with 4 miles of nonmotorized trails. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> primitive and/or unconfined recreation for hiking, backpacking, horseback riding, hunting, fishing, gathering forest products, cross-country and backcountry skiing, and snowshoeing; and opportunities for solitude are very high in the summer, whereas in the winter a small portion of the area (3 percent) allows for motorized over-snow vehicle use, which may impact opportunities for solitude.

Swan Front Recommended Wilderness Area

This recommended wilderness area is derived from the Swan Face South wilderness inventory area.

Table G-7. Swan Front recommended wilderness area

Factors	Description
1. Acres	42,534 acres
2. Summarized description of the recommended boundary	This area's boundaries generally follow those of the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485 in this area. The southern boundary is a ridgeline that is the administrative boundary

Factors	Description
	between the Flathead National Forest and the Lolo National Forest. The northern boundary is adjacent to the Alcove recommended wilderness area and follows the ridgeline off Inspiration Point to a section line. A portion is adjacent to the Swan River State Forest. The eastern boundary is adjacent to the Bob Marshall Wilderness. The western boundary generally follows the existing inventoried roadless area boundary, although portions of the western boundary excludes six small areas of the inventoried roadless area that narrowly extend out towards the valley bottom.
3. Brief description of the general geography, topography, and vegetation	The area includes steep ridges, and a continuous chain of high and often treeless, rugged mountains forms the eastern boundary. Below the high peaks is the canyon zone, where the streams of the face plunge down narrow bottoms between steep sideslopes until they reach the valley floor. Rocks and cliffs prevail in much of the canyon zone. The area includes high-elevation sparse vegetation and avalanche chutes. The existing vegetation is subalpine fir, lodgepole pine, Douglas-fir, whitebark pine, and western larch. The highest point in the area is Holland Peak at 9,356 feet.
4. Current uses and management	The 1986 forest plan primary direction is unroaded lands suitable for dispersed recreation that meets the recreation opportunity spectrum class of primitive. About 100 percent of this area contains the 1986 forest plan Swan Front recommended wilderness area. About 99 percent of the area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485. The primary summer and winter recreation opportunity spectrum class is primitive. The area has 20 miles of nonmotorized trails. This area contains Holland Lookout which is a functioning lookout that is used as needed.
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	Natural quality —The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention. Undeveloped quality —The majority of this area is undeveloped and not affected by human intervention. This area has 20 miles of nonmotorized trails. Unconfined and/or primitive recreation —Outstanding opportunities for unconfined or primitive recreation include hiking, horseback riding, fishing, and big-game hunting, camping, backpacking, and viewing wildlife. Napa Point, Smith Creek, and Holland Lake Trails are major access points to the Bob Marshall Wilderness. Solitude —The majority of the area is within an inventoried roadless area, which provides screening of sight and sound and provides outstanding opportunities for solitude. The western boundary is close to private land, which might reduce opportunities for solitude in that area. Other features of value —None. The Forest's ability to protect and manage these wilderness characteristics is very high. About 94 percent of this area is within the Bear-Marshall-Scapegoat-Swan Inventoried Roadless Area #1485, and about 100 percent of this area is within the 1986 forest plan's Swan Front recommended wilderness area. The western boundary generally follows the inventoried roadless area boundary. It meanders around roads and private property and along contour lines and may pose a challenge to managers as the boundary is not always based on natural features that are locatable on the map or on the ground.

Factors	Description
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> There is public interest in recommended wilderness areas adjacent to the Bob Marshall Wilderness and within inventoried roadless areas. This area is adjacent to the Bob Marshall Wilderness and would expand the Bob Marshall Wilderness by 42,534 acres. The North and South Forks of Lost Creek and Lion Creek are spawning streams for bull trout and are designated as critical habitat. The South Fork of Lost Creek contains pure populations of westslope cutthroat trout. The section along the Swan Crest provides maternal denning habitat for wolverines. There is high-quality grizzly bear habitat. There is high-quality winter and summer habitat for mountain goats in rugged terrain along the Swan Crest. Area provides habitat for alpine mountainsnails. Lower Holland Falls has the only known nesting colony of black swifts on the Forest. Lion Creek is an eligible wild and scenic river. The area represents the opportunity to add 10,028 acres of underrepresented ecological groups to the National Wilderness Preservation System.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> the naturalness of the area because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as the grizzly bear, lynx, wolverine, mountain goat, bull trout, and westslope cutthroat trout; and the undeveloped quality of the area is very high because the area is unroaded and 98 percent of the area is within the 1986 forest plan's Swan Front recommended wilderness area. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> outstanding opportunities for solitude, and primitive and/or unconfined recreation opportunities for hiking, backpacking, horseback riding, hunting, fishing, gathering forest products, cross-country and backcountry skiing, and snowshoeing.

Tuchuck-Whale Recommended Wilderness Area

This recommended wilderness area is derived from the Tuchuck and Whale wilderness inventory areas.

Table G-8. Tuchuck-Whale recommended wilderness area

Factors	Description
1. Acres	79,821 acres
2. Summarized description of the recommended boundary	<p>This area is bisected by two roads that are not included into the recommended wilderness area: Frozen Lake Road 114A in the northern part has 3 miles of open yearlong road and then the road is barriered and closed to motorized use for 6 miles. In the wintertime, this road is a designated motorized over-snow vehicle route corridor, including 100 feet either side of the route corridor.</p> <p>The southern road is the Graves Creek/Trail Creek NFS Road 114, which is open yearlong, but in winter snowmobiles can only go to the</p>

Factors	Description
	<p>Tuchuck campground. This road is excluded from the recommended wilderness area.</p> <p>The area generally follows boundaries of the Tuchuck and Thompson-Seton Inventoried Roadless Areas. The northern boundary follows the Canadian/United States border until 2 miles from Frozen Lake, and then it follows adjacent areas that were previously harvested up to the Whitefish divide. The northern boundary excludes the clearing along the international boundary line, where the vegetation is routinely removed. The western boundary is just off (by 100 feet) the Whitefish Divide Trail #26 (Pacific Northwest National Scenic Trail) between the Kootenai and Flathead National Forests to Link Mountain. There is a 2-mile linear exclusion consisting of buffered trail 374 to Huntsberger Lake that is outside the recommended wilderness area. The southern boundary follows ridgelines around the Chain Lakes area and then goes just north of Red Meadow Road (circumventing the Chain Lakes area). North of Red Meadow NFS Road 115, the boundary follows past harvest areas. The eastern boundary meanders in and out of drainages to follow past harvest areas and roads. The northeast portion of the eastern boundary follows the county's wildland-urban interface boundary.</p>
3. Brief description of the general geography, topography, and vegetation	<p>The topography consists of steep alpine glaciated canyons and gently rolling ground moraines, with glacial cirque headwalls, glacial trough walls, high-elevation slab rock, and glacial tills. Nasukoin Mountain at 8,086 feet is the highest point in the area. The major drainages are Trail Creek, Whale Creek, and Red Meadow Creek. The predominant tree species are lodgepole pine and western larch with a mixture of subalpine fir, Douglas-fir, and spruce. Whitebark pine dominates in the upper elevations. Alpine larch, a rare high-elevation species, is also present.</p>
4. Current uses and management	<p>The 1986 forest plan management direction is timber and non-forested lands capable of providing grizzly bear habitat located in the Trail Creek area. About 91 percent of the area is within the following inventoried roadless areas: Mount Hefty (10 percent), Thompson-Seton (59 percent), and Tuchuck (22 percent). The primary winter and summer recreation opportunity spectrum class is semiprimitive nonmotorized.</p> <p>The area has 4.5 miles of existing roads that are closed yearlong, 16 miles of historical roads that are no longer on the road system, and 82 mile of nonmotorized trails miles that allow mechanized transport.</p> <p>The area contains the Thoma Lookout, which is currently active during the fire season. The area also contains the Mount Hefty electronic site.</p>
5. Description of the wilderness characteristics and the Forest's ability to protect and manage the area so as to preserve its wilderness characteristics	<p>Natural quality—The majority of this area is very natural appearing, and the current vegetation is primarily affected by natural ecological processes. This area has mostly intact ecological integrity and generally appears to reflect ecological conditions that would be associated with the area without human intervention.</p> <p>Undeveloped quality—This area is mostly undeveloped and not affected by human intervention. The area has 4.5 miles of existing roads that are closed yearlong and 82 mile of nonmotorized trails. Thoma Lookout is an active fire lookout in this area.</p> <p>Unconfined and/or primitive recreation—Opportunities include hiking, backpacking, horseback riding, hunting, forest product gathering, wildlife watching, cross-country skiing, snowshoeing, and backcountry skiing.</p> <p>Solitude—There are outstanding opportunities for solitude because the area is adjacent to the U.S./Canada border on the north, national forest system lands to the west and south, and private lands to the east. Ninety-one percent of the area is an inventoried roadless area.</p> <p>Other features of value—Healthy whitebark pine that has apparent natural resistance to blister rust occurs within this area, with the potential to provide seed for whitebark pine restoration programs.</p>

Factors	Description
	<p>The Forest's ability to protect and manage these wilderness characteristics is very high. About 91 percent of this area is within the 3 inventoried roadless areas. The current boundaries may pose a challenge to managers as they are not always based on natural features that are locatable on the map or on the ground.</p>
6. Brief summary of the factors considered and the process used in evaluating the area and developing the alternative(s)	<ul style="list-style-type: none"> ○ There is high public interest in this area; it was part of the Whitefish Range Partnership agreement and the area within the wilderness inventory area was carried forward as recommended wilderness. ○ The Tuchuck Research Natural Area (2,050 acres) is within this recommended wilderness area. ○ Graves Creek/Trail Creek is an historic Native American travel corridor. ○ Bull trout and westslope cutthroat trout are present in Trail and Whale Creeks (designated bull trout critical habitat). ○ This area is important for providing connectivity with Canada and between the Whitefish Range and Glacier National Park for grizzly bear, wolverine, and Canada lynx. ○ This area provides high and very high quality grizzly bear habitat, with a high density of grizzly bears. ○ Nokio, Yakinikak, Trail, and Whale Creeks are eligible wild and scenic rivers within this area. ○ This area represents an opportunity to add 6,018 acres of underrepresented ecological groups within the National Wilderness Preservation System. There is a substantial amount of apparent blister rust-resistant whitebark pine in the upper elevations. Alpine larch, a rare high-elevation species, is also present.
7. Brief summary of the ecological and social characteristics that would provide the basis for suitability for inclusion in the National Wilderness Preservation System	<p>The <i>ecological characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ the naturalness of the area because much of the area is affected primarily by natural forces, has mostly intact ecological integrity, and contains many indigenous species such as the grizzly bear, lynx, wolverine, mountain goat, bull trout, and western cutthroat trout; ○ the undeveloped quality of the area is high as this area is unroaded; and ○ a unique ecological feature is the phenotypically superior whitebark pine trees identified in this area that may provide seed for whitebark pine tree restoration objectives. <p>The <i>social characteristics</i> that provide the basis for suitability are as follows:</p> <ul style="list-style-type: none"> ○ opportunities for primitive and/or unconfined recreation for hiking, backpacking, horseback riding, hunting, fishing, gathering forest products, cross-country and backcountry skiing, and snowshoeing; and ○ outstanding opportunities for solitude.