



Forest Service  
U.S. DEPARTMENT OF AGRICULTURE

Rocky Mountain Region

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# Grand Mesa, Uncompahgre, and Gunnison National Forests Revised Land Management Plan



Delta, Garfield, Gunnison, Hinsdale, Mesa, Mineral, Montrose, Ouray,  
Saguache, San Juan, and San Miguel Counties, Colorado



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*Front Cover:*

*Top left: A backpacker enjoys a snack and the view of Mt. Sneffels from lower Blue Lake on the Ouray Ranger District.*

*Top right: Feeding trout disturb the glassy surface of Lost Lake Slough as the glow of sunrise illuminates East Beckwith Mountain on the Paonia Ranger District.*

*Bottom left: An inflatable kayak and stand-up paddleboard rest on the soft banks of Alta Lakes on the Norwood Ranger District.*

*Bottom middle: The soft pink hues of alpenglow bathe the historic Lands' End Observatory at the edge of the Grand Mesa on the Grand Valley Ranger District.*

*Bottom right: A wary brown trout carefully examines a fly angler's presentation on the Lower Taylor River on the Gunnison Ranger District.*

# **Grand Mesa, Uncompahgre, and Gunnison National Forests**

## **Revised Land Management Plan**

**Delta, Garfield, Gunnison, Hinsdale, Mesa, Mineral, Montrose,  
Ouray, Saguache, San Juan, and San Miguel Counties, Colorado**

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[Forest Plan Revision Webpage](#)

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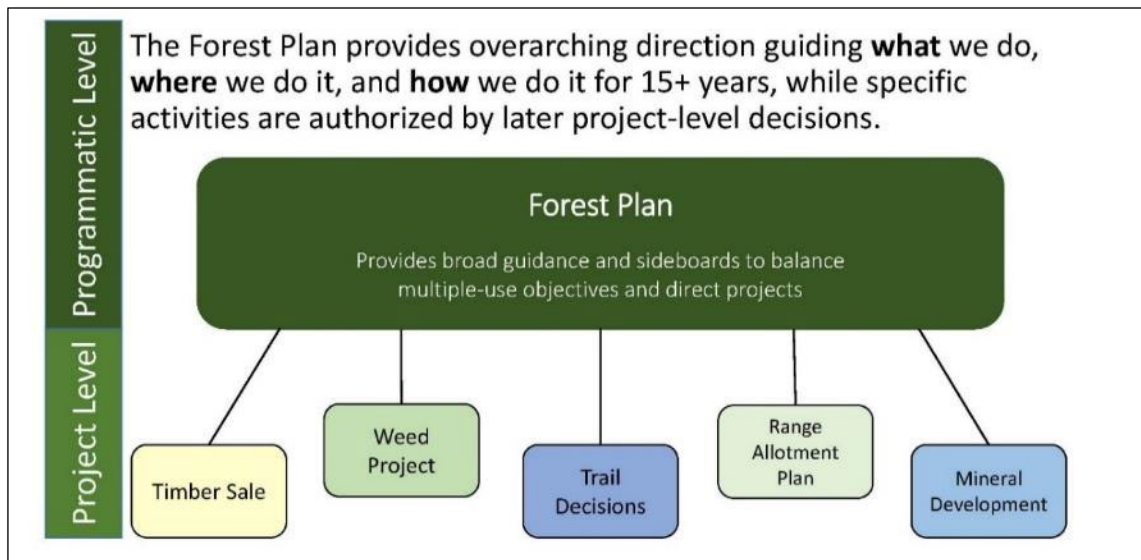
## Chapter 1. Introduction

This forest plan provides direction for the management of the Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG) by guiding programs, practices, and projects.

### What is a Forest Plan?

Forest plans establish overall management direction and guidance for each national forest. The GMUG forest plan guides project implementation, practices, and uses that assure sustainable multiple use management and outputs for the national forests. The forest plan describes desired conditions, goals, objectives, standards, and guidelines, and identifies land suitability for multiple uses and resources in the plan area. This is similar to a city or county comprehensive plan that helps guide land use and development. Forest plan direction applies only to National Forest System lands and does not imply or form direction for other ownerships (36 CFR 219.2).

Forest plans are strategic in nature and do not compel any action, authorize projects or activities, or guarantee specific results. Forest plans provide the vision and strategic direction needed to move a national forest toward ecological, social, and economic sustainability. Projects and activities must be consistent with the forest plan (36 CFR 219.15), and so a forest plan may restrict the agency when it authorizes or conducts those activities. Project-level environmental analysis would be completed for specific proposals that would implement forest plan direction. Forest plans do not regulate public uses, though the plan can provide direction that can then be enforced by forest order. See figure 1.



**Figure 1. Forest plans guide management of a national forest**

Plan components included in forest plans provide integrated management direction that provide for the social, economic, and ecological sustainability and multiple uses of national forest lands and resources. In May 2012, the U.S. Department of Agriculture adopted 36 CFR 219 regulations, referred to as the 2012 Planning Rule, to guide science-based development, amendment, and 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 decision-making in the national forests for about the next 15 years. This guidance includes:

- Forestwide components that 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),
- (If any) Recommendations to Congress for lands to include in the National Wilderness Preservation System, and identification of rivers eligible for inclusion in the National Wild and Scenic Rivers System (36 CFR 219.7(2)(v) and (vi)),
- The area’s distinctive roles and contributions within the broader landscape,
- Identification or recommendation of other designated areas (36 CFR 219.7 (c)(2)(vii)),
- Identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 CFR 219.7(c)(2)(vii) and 219.11),
- Identification of the maximum quantity of timber that may be removed from the plan area (36 CFR 219.7 and 219.11 (d)(6)),
- Identification of geographic area or management area-specific components [36 CFR 219.7 (c)(3)(d)],
- Identification of watersheds that are a priority for maintenance or restoration [36 CFR 219.7 (c)(3)(e)(3)(f)], and
- A monitoring program [36 CFR 219.7 (c)(2)(x) and 219.12].

The 2012 Planning Rule implemented a three-phase plan revision process that includes assessment, plan development, and implementation monitoring. Assessments for the GMUG plan revision process were completed in 2019. The working draft plan was published for public comment in summer 2019, and the draft plan was published for formal public comment in summer 2021. The draft Record of Decision was published for administrative review in summer 2023, and the final Record of Decision for the revised GMUG plan was signed in May 2024.

## Implementing the Forest Plan

The forest plan guides resource management. The forest plan does not authorize projects or activities. The Forest Service adheres to all laws, regulations, policies, and Executive orders that relate to managing National Forest System lands. The forest plan is designed to supplement, not replace, direction from these sources. Overall, forest plan direction does not repeat existing laws, regulations, policies, and Executive orders within forest plan components, except to explicitly emphasize some direction in response to local concerns, and/or where required by the planning rule. *Existing pertinent law, regulation and policy is identified in plan appendix 5, Relevant Federal Statutes, Regulations, Policies, and Agreements.*

The forest plan will be implemented recognizing valid existing or statutory rights such as, but not limited to: Tribal rights such as those reserved by the Tribes per the 1873 Brunot Cession per Memorandums of Understanding with the State of Colorado; water rights—which are administered by the State of Colorado; reserved or outstanding or private mineral rights or rights granted by the U.S. mining laws (General Mining Act of 1872), as amended, including the right of entry and reasonable access to public domain lands subject to the U.S. mining laws.

During project-level, site-specific analysis, agency planning teams should:

1. Identify applicable Forestwide plan components (desired conditions, objectives, standards, and guidelines) for the proposed project (*see chapter 2*), and
2. Identify plan components that are specific to management areas for the proposed project area (*see chapter 3*).

## **Project and Activity Consistency with the Forest Plan**

As required by National Forest Management Act and the 2012 Planning Rule, subject to valid existing or statutory rights, all projects and activities authorized by the Forest Service after the implementation date of the revised plan must be consistent with the applicable plan components [16 U.S.C. 1604(i)] as described at 36 CFR 219.15.

Projects and activities approved prior to the effective date of the revised plan shall be unaffected by the land management plan, until such time as when any pertinent reauthorizations are being considered. These pre-existing actions were considered part of the baseline in developing the revised plan and its effects.

The National Forest Management Act of 1976 and the 2012 Planning Rule require that all projects and activities authorized by the Forest Service be consistent with all applicable plan components (16 U.S.C. 1604 (i) as described at 36 CFR 219.15 (c and d)). Therefore, all project and activity approvals, new authorizations, and reauthorizations for occupancy and use made after the effective date of the revised plan will describe how the project or activity is consistent with the applicable components of the plan. The approving document must describe how the given project or activity is consistent with applicable plan components by meeting the following criteria (36 CFR 219.15(d)):

1. Desired conditions and objectives. Projects or activities contribute to the maintenance or attainment of one or more desired conditions or objectives or do not foreclose the opportunity to maintain or achieve any desired conditions or objectives over the long term.
2. Standards. Projects or activities comply with applicable standards.
3. Guidelines. Projects or activities:
  - a. Comply with applicable guidelines as set out in the plan, or
  - b. Are designed in a way that is as effective in achieving the purpose of each of the applicable guidelines [219.7(e)(1)(iv)].
4. Suitability. Projects or activities occur in an area:
  - a. That the plan identifies as suitable for that type of project or activity, or
  - b. When the plan does not specify 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 can do one of the following, 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.



*See also the Final Record of Decision for the revised GMUG Land and Resource Management Plan for additional direction regarding project and activity consistency.*

As noted below, management approaches in the revised forest plan support implementation of the forest plan, but they are not requirements – projects are not required to document consistency with these applicable approaches. However, implementing staff may elect to document which plan management approaches have been applied or modified, or alternative best available strategies, to facilitate transparency and public understanding. *See also section below, Integrated Direction – Cross-Referenced Plan Components and Management Approaches.*

## **Plan Components and Other Plan Content**

Plan components guide future projects and activities (figure 2). Plan components are not commitments or final decisions to approve projects or activities.

### **Desired Conditions**

A desired condition is “a description of the specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but do not include completion dates” [36 CFR 291.7(e)(1)(i)].

Some resources may already be at their desired condition, while for others, desired conditions may only be achievable over a long period of time.

### **Objectives**

An objective is “a concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions” [36 CFR 219.7 (e)(1)(ii)].

Objectives were developed considering the historic and anticipated budget allocations and staffing level for the GMUG, as well as professional experience in implementing various resource programs. Accomplishment of objectives may surpass these projections or may fall short based on numerous factors, including budget and staffing increases or decreases, changes in planning efficiencies, and unanticipated resource constraints.

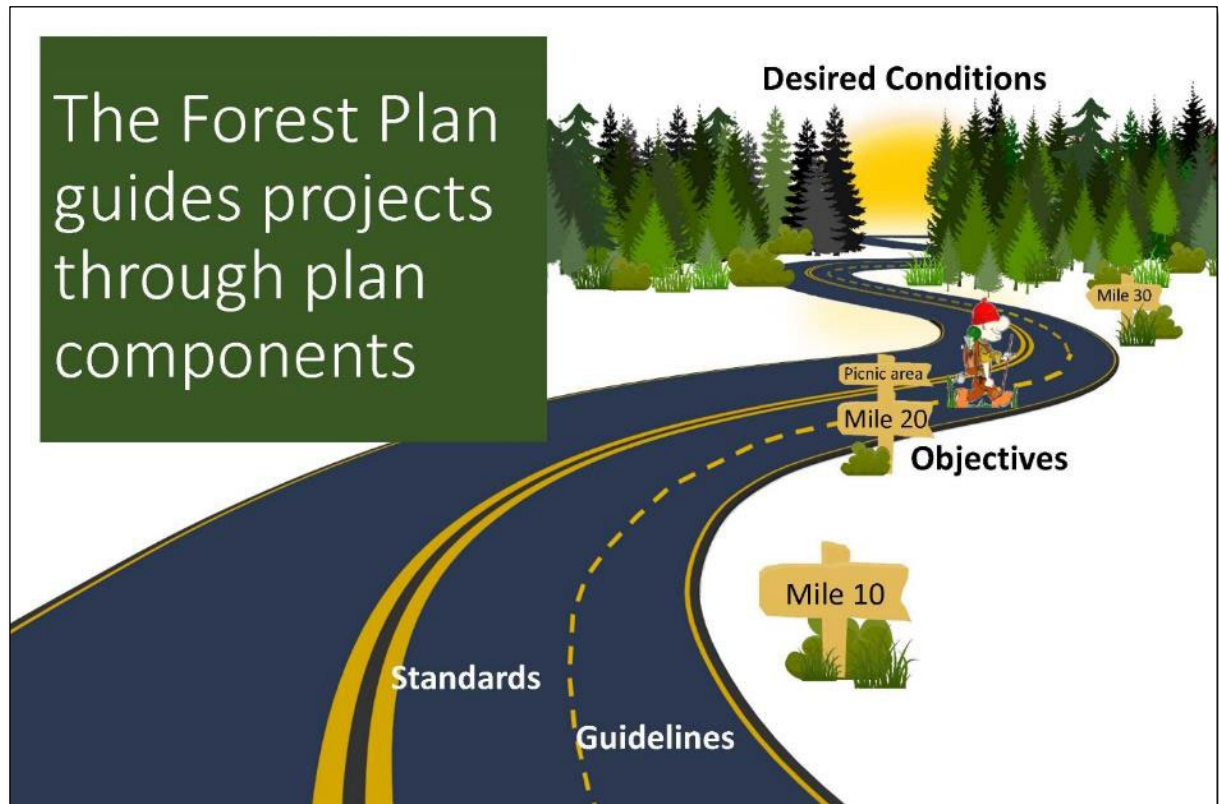
### **Standards**

A standard is “a mandatory constraint on project and activity decision-making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements” [36 CFR 219.7(3)(1)(iii)]. Standards are either applied Forestwide or they are identified as specific to a particular management area.

### **Guidelines**

A guideline is “a constraint on project and activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements” [36 CFR 219.7(3)(1)(iv)]. A guideline is either applied Forestwide or is identified as specific to a management area. The purpose is written as the first part of each

guideline (e.g., “To minimize invasive plant establishment and soil loss, rehabilitation activities in burn areas should...”).



**Figure 2. Plan components restrict and guide projects to move toward desired conditions**

## Management Approaches

Per FSH 1909.12.22.4, “management approaches describe the principal strategies and program priorities the responsible official intends to employ to carry out projects and activities developed under the plan. The management approaches can convey a sense of priority and focus among objectives and the likely management emphasis. Management approaches should relate to desired conditions and may indicate the future course or direction of change, recognizing budget trends, program demands and accomplishments. Management approaches may discuss potential processes such as analysis, assessment, inventory, project planning, or monitoring.”

Management approaches are not plan components; they are not requirements to be met during the course of the plan implementation. Although management approaches in the revised forest plan are identified by an alphanumeric code (e.g., FW-MA-CCC-01), this numbering is used to support cross-referencing and easy identification during implementation. The cross-references do not indicate that these management approaches are required to be implemented in order for compliance with a particular standard or guideline. Again, the management approaches are optional plan content, used to identify supporting strategies for implementation and to “facilitate transparency and give the public and governmental entities a clear understanding of the plan and how outcomes would likely be delivered” (FSH 1909.12.22.4).

Management approaches may be changed administratively.

## Management Areas

A management area is a “land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous” (36 CFR 219.9). Management areas are defined by purpose, as opposed to geography. Plan components for a management area may differ from Forestwide guidance by:

- Constraining an activity where Forestwide direction does not,
- Constraining an activity to a greater degree than Forestwide direction, or
- Providing for an exception to Forestwide direction, when Forestwide direction would otherwise conflict with the management emphasis of the management area.

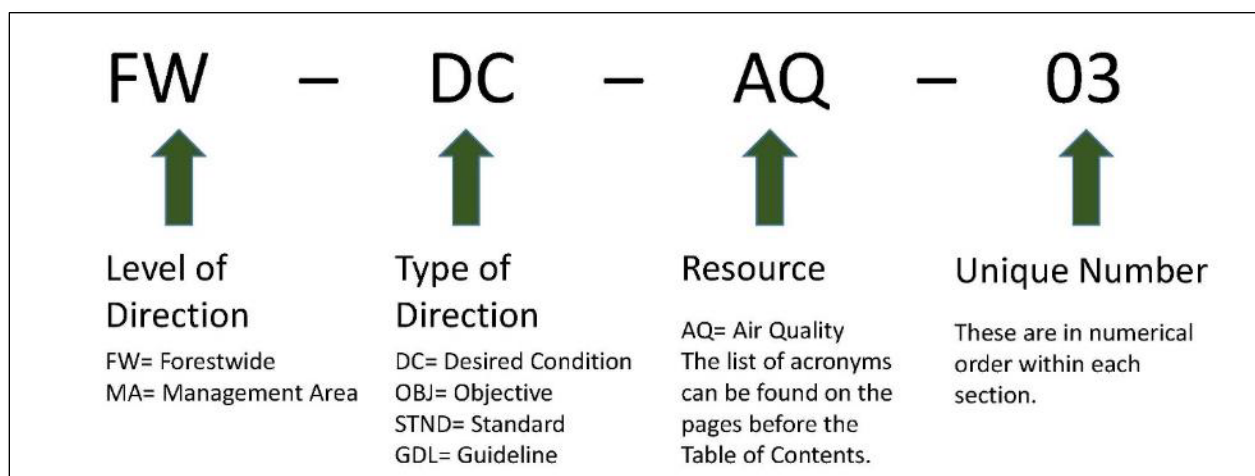
*See chapter 3 for management area direction.*

## Plan Component Codes

Desired conditions, objectives, standards, guidelines, and management approaches are identified by alphanumeric code for reference purposes (figure 3). The identifiers include, in the following order:

- the spatial scale of the direction (e.g., FW = Forestwide, MA = Management Area),
- the type of direction or optional plan content (DC = desired condition, OBJ = objective, STND = standard, GDL = guideline, MA = management approach),
- for *Forestwide direction*, the resource (e.g., WTR = watersheds, SPEC = species),
- for *Management Area direction*, the type of management area is indicated (e.g., for Mountain Resorts, MA-DC-MTR-01), and
- a unique number (e.g., in numerical order starting with 01; may include 01a).

Thus, Forestwide direction for desired conditions associated with watersheds and water resources is identified starting with FW-DC-WTR-01, and management area direction for desired conditions in the Mountain Resorts Management Area is identified starting with MA-DC-MTR-01. The identifiers are included as part of the headings in chapters 2 through 3, with the unique alphanumeric identifier preceding each plan component.



**Figure 3. Plan component codes**



## Integrated Direction – Cross-Referenced Plan Components and Management Approaches

Plan component codes are also used to not only identify singular plan components and management approaches, but also to illustrate the connections between integrated plan direction. Per 36 CFR 219.10(a), “the plan must include plan components, including standards or guidelines, *for integrated resource management* to provide for ecosystem services and multiple uses in the plan area.” Making these connections explicit facilitate not only public understanding of the plan, but also future implementation by forest staff and decision-makers. Therefore, cross-references are frequently used in the revised GMUG forest plan to communicate how plan components are integrated between various sections, highlighting the importance of viewing the plan holistically rather than just reviewing direction for a single resource. Cross-references also help to illuminate plan components that could have easily been located within two or more sections and may otherwise be overlooked; but avoids the need to repeat such direction throughout the plan. For example, the implementation of specific management direction to limit invasive species impacts on the Western Toad is located within the plan section *Western Toad* section of the plan, and this direction is cross-referenced from the more general plan section *Invasive Species*.

Per FSH 1909.12.20.23, “a separate plan section, or even a unique plan component, is not required for each topic. Rather, the plan components should be integrated in any manner that ensures that the plan, as a whole, meets each of the Rule’s requirements. One plan component can address more than one requirement; for example, a standard that limits soil disturbance during timber harvesting operations would respond to the Rule’s requirements that timber harvest not irreversibly damage soil and be carried out consistent with the protection of soil, as well as the Rule requirements regarding the maintenance or restoration of ecological integrity, riparian areas and water quality.”

Although the management approaches in the revised forest plan are also labeled with this alphanumeric code (e.g., FW-MA-CCC-01), they are implementation strategies and not requirements (*see section Management Approaches, above*). Where cross-references are used between standards and guidelines and management approaches, this does not mean a management approach must be implemented to comply with a particular standard or guideline. They are used to identify supporting strategies for implementation “facilitate transparency and give the public and governmental entities a clear understanding of the plan and how outcomes would likely be delivered” (FSH 1909.12.22.4).

Compliance with a standard or guideline is contingent upon compliance with that *singular* plan component. If the standard or guideline contains a cross-reference to *another* standard or guideline, this does not indicate that both would be required to be applied per se – the relevance of each singular plan component is determined at the project-level. If a future plan amendment were to modify a specific standard or guideline, it would not inherently modify any other integrated, cross-referenced plan direction. Throughout plan implementation, administrative changes may correct, update, and add to cross-referenced plan components over time.

Between draft and final versions of this plan, some plan components were moved or removed, but the numbering was typically not modified to preserve integrity of related documents and comparison between plan versions. There may infrequently be a gap between plan component numbers or skipped numbers, and this is intentional. Similarly, some plan components were added, and those are identified with “.a, .b, etc.” (e.g., FW-GDL-TMBR-07.a).

## Forest Plan Vision, Roles, and Contributions

### The Big Picture: A Vision of the Grand Mesa, Uncompahgre, and Gunnison National Forests

The GMUG national forests comprise diverse lands within a diverse region, yet our communities are united by the shared vision to promote the ecological integrity of these national forests—a landscape of resilient, climate-adapted ecosystems sustaining ecosystem services and balanced multiple-use opportunities far into the future. Through collaboration, education, and shared stewardship, these national forests are managed so that they are ecologically sustainable and contribute to social and economic sustainability; consist of ecosystems and watersheds with ecological integrity and diverse plant and animal communities; and have the capacity to provide the region with ecosystem services and multiple uses that contribute to the identity, health, and economies of adjacent communities, enhancing their prosperity and quality of life.

### Why the GMUG Matters: Distinctive Roles and Contributions in the Larger Landscape

#### *Ecological Sustainability*

Covering more than 3.2 million acres of lands that range in elevation from 5,000 to over 14,000 feet, the GMUG is a vast and diverse landscape, with mountain streams cascading through dense forests of spruce-fir, and rangelands that include meadows interspersed with aspen groves, riparian areas, sagebrush and oak. These lands provide large backcountry habitats essential for maintaining several rare, threatened, and endangered species, and a wide variety of fish, wildlife, and other species, sustaining biodiversity in an increasingly populated region. In addition to their own intrinsic value, these ecosystems also support critical services—such as clean water, clean air, carbon uptake and storage, and healthy soil—and multiple use opportunities, the continued provision of which necessitates managing and maintaining their structure, function, and composition. As the climate changes, the large, contiguous land area and wide elevational gradient of the GMUG provides important opportunities for species to find refugia and for ecosystems to adapt to changing conditions.

Ecological sustainability is the foundation of the plan and the 2012 planning rule, which is why it is featured in Part 2 of the forest plan, followed by Part 3, Ecosystem Services and Multiple Uses.

#### *Ecosystem Services and Multiple Uses*

Due to its size and diversity of ecosystems, the GMUG supports a multitude of ecosystem services, which in turn support a wide variety of multiple uses. Management to maintain and improve GMUG ecosystems will ensure these intrinsic values and sustainable uses continue into the future. These values, services and uses are featured in Part 3 of the forest plan.

- With more water-related special uses than any other national forest, the GMUG serves as critical headwaters. Protecting and sustaining these watersheds provides a high-quality, local source of 1.9 million acre-feet of water —more than 20% of the total Colorado River supply — for western Colorado and the southwestern United States, while supporting the region’s ecosystems and wildlife. Given current trends and continued projections for more drought and decreased snowpack in the region due to climate change, sustaining these headwaters will become even more critical.

- The GMUG provides year-round recreation opportunities for rapidly increasing populations of Western Slope communities and attracts visitors from the region and around the world. Recreation settings range from highly developed ski resorts to rugged jeep trails to primitive wilderness, and attractions include world-renowned destinations such as Telluride and Crested Butte, six scenic and historic byways, five 14,000+ foot peaks, and the Continental Divide National Scenic Trail, among others. Locals and visitors to the GMUG enjoy high-quality hiking and trail running; fishing; motorized recreation; camping; mountain biking; rafting and kayaking; hunting; horseback riding; scenic driving; wildlife and wildflower viewing; rock climbing; cross-country, backcountry, and downhill skiing; snowboarding; snowmobiling; and many other forms of recreation. Recreation is the GMUG's largest economic contributor (*see the FEIS Vol. 1, Chapter 3, Socioeconomics, Effects Common to All Alternatives*). The scenic beauty of the rugged mountains, canyons and mesas, combined with the accessibility of the landscape, also contributes to the desirability of the area and quality of life. As climate change leads to warmer weather at lower elevations, the high-elevation forests of the GMUG will offer escapes to "beat the heat" during the summer. Earlier snowmelt at lower elevations may similarly concentrate winter recreationists in the GMUG in higher elevations.
- The GMUG provides functional habitat for large populations of mule deer and Rocky Mountain elk, bighorn sheep, moose, a wide variety of game birds, and multiple native trout species—as well as other nongame wildlife, wildflowers, and pollinators. In addition to their intrinsic value, these species attract a large number of hunters, anglers, and other visitors from across the country, providing an economic boon to local communities. More than 50,000 big game hunting permits are issued each year for the game units within the GMUG.
- The natural environment offers an excellent field laboratory for environmental research and education, including research conducted by scientists from more than 100 colleges and universities as well as national labs and federal agencies. The research has provided globally relevant insights into biodiversity, food security, water quality and quantity, air quality, and human health and has supported management of public lands in the region, including but not limited to documentation of uncommon species, the distribution and management of invasive species, and the general impacts of recreation on wildlife.
- The GMUG is the ancestral home of the Ute Mountain Ute Tribe, the Ute Indian Tribe, the Southern Ute Tribe, the Pueblo of Acoma, Pueblo of Zuni, Pueblo of Zia, The Jicarilla Apache Nation, The Navajo Nation, The Hopi Tribe, and the Paiute Indian Tribe of Utah, and the Northern Pueblo Tribes, including the Pueblo of Nambe, the Pueblo of Picuris, the Pueblo of Pojoaque, the Pueblo de San Ildefonso, the Ohkay Owingeh, the Pueblo of Santa Clara, the Pueblo of Taos, and the Pueblo of Tesuque.
- Historic, prehistoric, and paleontological sites across the GMUG landscape inspire a sense of discovery, connection to, and appreciation for the past, including the Old Spanish Trail, the mining history along the Alpine Loop in the San Juan Mountains, and scattered homesteads.
- The GMUG has one of the largest rangeland resource bases— nearly 2.4 million acres— of any national forest in the United States, with approximately 51,000 permitted cattle and 27,000 permitted sheep. The GMUG's grazing program contributes to the economic feasibility of ranching in the planning area. The grazing program also helps to maintain agricultural open space on private lands otherwise pressured by subdivision and development (USDA Forest Service 2006a). The more than 100-year history of livestock grazing by ranching families in the region has contributed to a specialized rural agricultural society with a strong interest in and capacity for public land stewardship.
- The GMUG stores more than 125 million metric tons of carbon in its forests, wetlands, rangelands, and soils, equivalent to the carbon emissions from 100 million passenger vehicles in

one year. Carbon stored both in the GMUG and its harvested wood products helps to offset sources of carbon dioxide to the atmosphere, such as forest fires and fossil fuel emissions. Forest carbon stocks in the GMUG remained steady or slightly increased between 1990 and 2020, and negative impacts on carbon stocks caused by disturbances and environmental conditions have been modest and exceeded by forest growth. The GMUG will continue to have an important role in maintaining the carbon stock, regionally and nationally, for decades to come.

- The GMUG continues to be a significant timber producer in the Rocky Mountain Region. The GMUG's vegetation management program plays a critical role in maintaining the health of the forest, including management for climate change adaptation and ecosystem restoration. The vegetation management program also contributes to the viability of the timber industry in the State of Colorado, with the industry serving as an essential partner to achieve multiple forest resource objectives. The largest sawmill in Colorado is located in Montrose and obtains its forest products from the GMUG and beyond, working within a 400-mile radius. Vegetation management projects on the GMUG also support numerous small timber operators in local communities.
- The GMUG's energy and mineral resources, including those of the Somerset coalfield and the Southern Piceance and Paradox oil and gas-producing basins, contribute to energy supply and local economies and generate royalty revenue to the U.S. treasury, state, and local governments. Other mineral commodities, such as aggregate or gravel, are used in maintaining forest and county roads. Hardrock minerals, mined under the General Mining Act of 1872, as amended, contribute to local and broader economies.

## Chapter 2. Forestwide Direction

### Part I: Social and Economic Environment

#### Socioeconomics (SCEC)

##### ***Desired Conditions***

**FW-DC-SCEC-01:** The provision of sustainable forest services, including clean air and water supplies and healthy fish and wildlife populations, contributes to the social and economic well-being of local communities. Commodities—including ample and wide-ranging scenic and recreation opportunities, timber, forage, and energy and minerals— foster robust industries and support local employment and income. The plan area benefits local residents and visitors by providing a wide range of key ecosystem services and opportunities such as volunteering, education, and scientific learning, contributing to the quality of life, sense of place, and connection with both nature and the region's history. *See Why the GMUG Matters: Distinctive Roles and Contributions in the Larger Landscape. See also supporting objectives, for example: SPEC-54; RMGD-06; WTR-04; FFM-02; IVSP-02; INFR-03; RNG-03; SPEC-37.b – SPEC-40; REC-03 and REC-04; SCNY-02 and TRLS-02, as well as the projected timber and other vegetation management program in plan appendix 2.*

#### Partnerships and Coordination (PART)

##### ***Desired Conditions***

**FW-DC-PART-01:** Partnerships with Federal, State, County, and Tribal agencies, universities, non-governmental organizations, lease and permit holders, and private landowners feature robust dialogue, shared stewardship, and meaningful engagement in forest plan implementation and project development, implementation, and monitoring efforts. Management activities in the GMUG are considered within the context of neighboring lands. Most management approaches identified throughout the plan emphasize and depend upon this coordination and partnership to enhance the GMUG's capacity to implement the forest plan.

##### ***Management Approaches***

**FW-MA-PART-02:** Maintain and expand contracting and partnering opportunities with State and local government, Tribes, businesses, and organizations. Develop partnerships that leverage different sources of funding to support opportunities to contribute to economic and social sustainability of local communities.

**FW-MA-PART-03:** Complete stewardship projects or activities that engage communities or groups in shared stewardship of public lands (e.g., terrestrial or aquatic ecosystem restoration projects, tree or shrub planting, native seed collection, trail building and maintenance, field trips, and citizen science monitoring).

## Educational and Interpretive Programs (EDU)

### ***Desired Conditions***

**FW-DC-EDU-01:** Educational and interpretive programs, activities and materials connect people, particularly youth, to the natural environment. The national forests provide pathways for youth in local communities to explore natural resource careers. These efforts foster a sense of place and shared stewardship of the national forests.

## Part II: Ecological Sustainability

### **Air Quality (AQ)**

### ***Desired Conditions***

**FW-DC-AQ-01:** Air quality in the planning area is maintained as defined in the Clean Air Act and meets National Ambient Air Quality Standards. The overall quality of the air contributes positively to human and ecosystem health, visibility, multiple uses, and wilderness values, acknowledging that short-term smoke impacts from local, regional, or national wildland and prescribed fire may occur.

**FW-DC-AQ-02:** Air quality and air quality-related values in congressionally designated wilderness areas are maintained and improved to natural conditions and do not exceed established critical loads or thresholds. Visibility is on a path toward natural conditions per the Regional Haze Rule and is not further degraded.

**FW-DC-AQ-03:** Wildland fuel loadings resemble natural range of variation conditions, reducing the potential for harmful effects on air quality from high-intensity wildfires.

### ***Standard***

**FW-STND-AQ-03.a:** Maintenance and improvement to congressionally designated wilderness areas' air quality and air quality-related values will follow current Forest Service policy and direction provided by the Federal Land Managers' Air Quality Related Values Work Group (FLAG) and the Forest Service Manual 2320, Wilderness Management. *See also management approach FW-MA-AQ-07.*

### ***Guidelines***

**FW-GDL-AQ-04:** To prevent dust from transporting from an area of disturbance, or drifting more than 50 feet from a road prism, forest authorizations for pertinent activities should require effective techniques for dust suppression for a) surface disturbance greater than 1 acre and longer than 5 days or b) projects involving road traffic when conditions result in less than 500 feet of sight distance *See also management approach FW-MW-AQ-09.*

**FW-GDL-AQ-05:** To maintain air quality and air quality-related values in the GMUG, the forest should not authorize activities if they would result in exceeding the associated established critical loads or limits of acceptable change, including but not limited to Class I areas. *See also management approach FW-MA-AQ-07.* **Exception:** prescribed fire activities, which produce short-duration localized air pollution effects and are managed to reduce such impacts. *See also management approach regarding prescribed fire FW-MW-AQ-08.*

**FW-GDL-AQ-06:** Where air pollution from on-Forest projects may affect air quality and established air quality-related values, the Forest Service should require mitigation to reduce potential impacts. Mitigation is determined based on the individual project, the environmental effects and existing conditions, and may range from dust suppression for authorizations requiring high-traffic activities on dirt roads (per FW-GDL-AQ-04) to the incorporation of air quality control technology on fossil fuel development. Mitigation recommendations should be designed in close coordination with the relevant air regulatory agencies and built into project requirements prior to project approval. For projects outside the boundaries of National Forest System lands that may affect air quality and air quality-related values on National Forest System lands, the Forest Service should recommend mitigation. *See also management approach FW-MA-AQ-07.*

### **Management Approaches**

**FW-MA-AQ-07:** An air quality analysis may be required for Forest Service approval of activities that would result in emissions. The appropriate complexity of the analysis is determined on a case-by-case basis at the project level, in consultation with air quality regulatory agencies and other federal land management agencies.

**FW-MA-AQ-08:** Provide early notification to the public about potential smoke from fire activities on the GMUG to promote awareness and protect human health and safety, including coordination with pertinent counties and municipalities for public notifications. Smoke from prescribed burning is managed per State of Colorado requirements via burn permits.

**FW-MA-AQ-09:** To support implementation of FW-GDL-AQ-04, best management practices include proactively minimizing fugitive dust by managing unpaved roads and applying dust suppression techniques for projects with dust-generating potential. Dust suppression techniques may include, but are not limited to, the application of water, other methods of soil stabilization, maintaining roads to avoid washboard like surfaces, and speed limit requirements for relevant authorized activities, including but not limited to logging and oil and gas-related traffic.



## **Aquatic Species and Habitat, Riparian Management Zones, Groundwater-Dependent Ecosystems, Watersheds, and Water Resources**

*Note: This section was re-organized between draft and final in response to public comments that requested all water- and riparian-related sections be located together.*

### **Aquatic Species and Habitat (AQTC)**

This section addresses general aquatic species habitat. *Additional specific aquatic species are addressed the Native Species Diversity section (e.g., western toad).*

*See also direction in the plan sections Riparian Management Zones and Groundwater-Dependent Ecosystems, Watersheds and Water Resources, Conservation Watershed Network, and Key Ecosystems Characteristics.*

### **Desired Conditions**

**FW-DC-AQTC-01:** Physical (e.g., stream temperature, pool frequency, spawning habitat) and biological (e.g., large wood, overbank vegetation) conditions in aquatic ecosystems provide the habitat requirements for aquatic and semi-aquatic species, including native amphibians, native and desired non-native fishes, macroinvertebrates, and native plant and periphyton communities.

**FW-DC-AQTC-02:** Water flows are sufficient to create and maintain riparian, aquatic, and wetland habitats; retain patterns of sediment, nutrient, and wood routing and transport while maintaining reference dimensions (e.g., bankfull width, depth, entrenchment ratio, sufficient pool depth to provide summer refugia and winter habitat, slope, and sinuosity); ensure floodplain inundation occurs, allowing floodplain development; and ensure that the timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Flows may also support water-related recreation including boating.

### **Objectives**

**FW-OBJ-AQTC-03:** Within 5 years of plan approval, 1) identify areas critical to the conservation of native aquatic and semi-aquatic species (e.g., spawning areas and breeding habitat), 2) develop monitoring (e.g., for streambank stability), and 3) if desired conditions are not being met and causal factors are identified, apply conservation measures to ensure the long-term persistence of associated native aquatic and semi-aquatic species, and the population viability of at-risk aquatic and semi-aquatic species. *See also the Forestwide objective RMGD-06.*

### **Standards**

**FW-STND-AQTC-04:** To prevent incidental mortality of native species during spawning and rearing periods (typically spring through summer), require water drafting and pumping sites to be screened and located away from native fish spawning and amphibian rearing locations. Pumps shall use low-entry velocity to minimize removal of aquatic species from aquatic habitats, including juvenile fish, amphibian egg masses, and tadpoles. Waters selected for drafting shall also be free of any known aquatic nuisance species, including but not limited to zebra and quagga mussels as well as diseases such as whirling disease. **Exception:** wildland fire operations. *See instead GDL-IVSP-07.a, GDL-IVSP-08 and IVSP-08.a for direction regarding wildland fire operations.*

**FW-STND-AQTC-05:** The minimum and necessary new, replacement, and reconstructed crossings (culverts, bridges, and other stream crossings) and in-stream structures (impoundments, diversions,

and weirs) on fish-bearing streams shall accommodate flood flows and allow aquatic organism passage, unless the accommodation would increase non-native species encroachment on native fish and amphibian habitat. Exceptions include temporary structures in place for less than one year. *See also the Forestwide guideline for connectivity SPEC-06 and for in-stream infrastructure RMGD-10.d.*

### **Guidelines**

**FW-GDL-AQTC-06:** To prevent entrainment or entrapment of native and desired non-native fishes and other aquatic organisms, new and reauthorized water withdrawal systems (e.g., impoundments, diversions, and associated ditches) should have screens (or comparable structures and equipment).

*For additional direction to prevent the spread of aquatic nuisance species, see FW-STND-IVSP-04, STND-IVSP-05, GDL-IVSP-07, GDL-IVSP-08 and IVSP-08.a, and GDL-SPEC-23.*

*See also all plan direction for the Conservation Watershed Network, beginning with the desired condition SPEC-53.*

### **Management Approaches**

**FW-MA-AQTC-07:** Consider the strategies and actions outlined in the Pathfinder Project Steering Committee Report (GMUG 2004), which support cooperation with Federal, State, Tribal, and local governments, and other stakeholders, regarding water flows to protect riparian resources, channel conditions, aquatic habitat, and associated recreational uses such as fishing and boating.

### **Conservation Watershed Network**

Conservation watershed networks are a specific set of subwatersheds (12-digit hydrologic unit codes) where prioritization for long-term conservation and preservation of green-lineage of Colorado River cutthroat trout and western toad (*previously named the “boreal toad”*) occurs, specifically in areas where either non-native species are absent or where these two native species are self-sustaining. These subwatersheds were selected based on the presence, conservation status, or viability, and the likely continued persistence for either native green-lineage Colorado River cutthroat trout or western toad. The target species for the selected conservation watershed network, and the hydrologic unit 12 code (HUC 12) for each subwatershed, is listed in table 1. *See plan appendix 7 for details regarding criteria for selection of subwatersheds.*

**Table 1. Target species and HUC 12 codes for Conservation Watershed Network subwatersheds**

[HUC 12, hydrologic unit 12 code]

Subwatershed	HUC 12 Code	Target Species	National Forest Unit
North Fork Escalante Creek	140200050303	Green lineage Colorado River cutthroat trout	Uncompahgre
East Fork Escalante Creek	140200050302	Green lineage Colorado River cutthroat trout	Uncompahgre
Fall Creek	140300030108	Green lineage Colorado River cutthroat trout	Uncompahgre
Clear Fork East Muddy Creek	140200040202	Green lineage Colorado River cutthroat trout	Gunnison
Paonia Reservoir	140200040401	Green lineage Colorado River cutthroat trout	Gunnison
Robinson Creek	140200040303	Green lineage Colorado River cutthroat trout	Gunnison
Smith Fork	140200021201	Green lineage Colorado River cutthroat trout	Gunnison
Steuben Creek	140200020402	Green lineage Colorado River cutthroat trout	Gunnison
Snowshoe	1402000403023	Green lineage Colorado River cutthroat trout	Gunnison
Headwaters Buzzard Creek	140100051102	Western toad (previously named the "boreal toad")	Grand Mesa
Upper East River	140200010201	Western toad (previously named the "boreal toad")	Gunnison
Texas Creek	140200010104	Western toad (previously named the "boreal toad")	Gunnison

### *Desired Conditions*

**FW-DC-SPEC-53:** Conservation watershed networks have high-quality habitat and functionally intact ecosystems that contribute to and enhance conservation and recovery of specific target species.

Each network contributes to establishment of a metapopulation to improve the resiliency of the respective population.

### **Objective**

**FW-OBJ-SPEC-54:** Within 5 years of plan approval, develop strategic plans for the target species (western toad (previously named the “boreal toad”) and green-lineage Colorado River cutthroat trout). Within 10 years of plan approval, complete two activities to restore or enhance habitat and address pertinent threats.

### **Standards**

**FW-STND-SPEC-55:** For subwatersheds included in the conservation watershed network for green lineage Colorado River cutthroat trout, ground-based equipment shall not be used in perennial streams nor in their riparian management zones during green lineage spawning, incubation, and emergence periods. The time period for this prohibition should be locally confirmed, dependent upon water flow and temperature, but is typically June through August.

### **Guidelines**

**FW-GDL-SPEC-57:** To reduce sedimentation, for subwatersheds included in the conservation watershed network, net increases in stream crossings and road lengths should be avoided in the riparian management zone unless the net increase improves ecological function in aquatic ecosystems. The net increase is measured from the beginning to the end of each project, such that temporary routes may be constructed, so long as properly closed and decommissioned. *See the Riparian Management Zones and Groundwater-dependent Ecosystems section for detailed direction regarding temporary and permanent infrastructure in the riparian management zone.*

*See also forestwide guidelines FW-SPEC-20 to SPEC-23 for additional direction for western toads (previously named “boreal toads”).*

## **Riparian Management Zones and Groundwater-Dependent Ecosystems (RMGD)**

This section covers the riparian ecosystems at the interface of, and dependent upon, water resources in the GMUG—all of which are considered in the forest plan and 2012 Planning Rule terminology to be part of the *riparian management zone*. This broad term includes the immediate feature and the adjacent area of perennial and intermittent streams, ephemeral streams and swales, wetlands, fen wetlands, and other groundwater-dependent ecosystems such as seeps and springs. Riparian management zones help maintain the integrity of aquatic ecosystems by 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, 2) providing root strength for channel stability, 3) shading the stream to support desired stream temperatures, 4) protecting water quality, and 5) allowing for flooding in the historic wetland extent. Another critical function of riparian management zones is to provide for wildlife habitat use and connectivity, and particularly with fens, carbon storage. In the context of a changing, drier climate, riparian areas will become more critical to maintain and restore.

Management activities in riparian management zones must often be planned, designed, implemented, and monitored differently than in upland/terrestrial ecosystems, and are also subject to specific standards and guidelines below.

It is important to note that most types of riparian management zones are most often not “no management” or “avoidance zones,” since management activities may be necessary to achieve desired ecological conditions. However, specific guidance is provided for activities within riparian management zones. For example, vegetation management is allowed in the riparian management zone only to restore or enhance the riparian or aquatic resources. Activities that can cause soil compaction or soil erosion are restricted or minimized.

*See also the direction in the plan sections Aquatic Species and Habitat, Watersheds and Water Resources, Conservation Watershed Network, Key Ecosystem Characteristics (ECO), Rangelands, Forage and Grazing, and Infrastructure.*

Note that “riparian management zone” is updated terminology that replaces the term “water influence zone” used in the 1983 GMUG forest plan and other policy. The riparian management zone is not named and mapped as an official “management area” as it was in the 1983 forest plan, due to the fact that the forest inventories of riparian features continue to evolve. However, this forest plan direction functions the same as if the riparian management zone were a management area—the direction applies to a specific area.

### ***Desired Conditions***

**FW-DC-RMGD-01:** Riparian management zones have the distribution of physical, chemical, and biological conditions appropriate to support their inherent resiliency to natural disturbances, human activities, and climate variability. As defined in best available scientific technical reports, they are functioning properly due to lateral migration—where applicable—and a connection between the stream channel/water source and the associated riparian area.

**FW-DC-RMGD-02:** Within the riparian management zones, the biological composition of native flora (e.g., willows, cottonwoods, sedges) and fauna (e.g., beaver) support the associated ecosystem services (e.g., filtering of sediment, modulation of floods, drought resiliency, carbon uptake and storage); providing a dynamic equilibrium of natural structure (e.g., channel morphology, floodplain development, large wood) and connectivity (e.g., periodic flooding, aquatic organism passage. Shade is maintained. The species composition provides the ecosystem services of water and carbon storage, particularly in fens—which are among the most carbon-dense ecosystems on the planet—and other wetlands.

**FW-DC-RMGD-03:** Hydrologic processes (e.g., infiltration, streamflow, sediment transport, hillslope runoff, or groundwater flow) within the riparian management zones function properly, providing appropriate periodic or permanent hydrologic connectivity and thereby sustaining native species composition.

**FW-DC-RMGD-04:** For streams, within the respective landform (e.g., valley bottom or confined canyon), the natural stream channel and floodplain (e.g., channel type, width-to-depth ratio) functions naturally or is restored to a dynamic equilibrium.

**FW-DC-RMGD-05:** Groundwater-dependent ecosystems and wetlands function under natural patterns of recharge, flow, and discharge within the respective landform (e.g., basin, hillslope). The water sources and hydrologic processes (e.g., suitable water table elevations, natural spring flow) needed to support groundwater-dependent ecosystems provide for the persistence of associated native plant and animal populations. Natural water quality is maintained. Fens continue to accumulate peat.

## Objectives

**FW-OBJ-RMGD-06:** During each 10-year period following plan approval, considering the historic extent of the watershed and riparian systems, restore or enhance at least 2,500 acres of riparian and wetland habitat – including groundwater-dependent ecosystems, and restore or enhance hydrologic function for at least 50 miles of perennial, intermittent, or ephemeral streams. Where consistent with forest plan direction and the Watershed Conservation Practices Handbook (FSH 2509.25), integrate recreational goals into the restoration action. *See plan appendix 2 for examples of restoration actions. See also the Forestwide objective for watersheds and water resources, WTR-04.*

**FW-OBJ-RMGD-6.a:** Within 3 years of plan approval, complete remote-sensing inventory of wetlands – including fen wetlands - on the GMUG, ongoing at the time of the plan decision. Prioritize ground-truthing within areas suitable for timber production and active grazing allotments, in order to incorporate them into timber sale and grazing management documents. *See supporting management approach FW-MA-RMDG-18.*

*See also the Forestwide objective for native species diversity SPEC-03, and the objective for the Recreation Emphasis Management Area EMREC-02.*

## Standards

*See also the plan section Watersheds and Water Resources and Range standard RNG-06.*

**FW-STND-RMGD-07:** Riparian management zones shall be delineated as indicated in table 2.

**Table 2. Riparian management zones**

Waterbody/Riparian Feature	Riparian Management Zone description
Perennial streams with native fish	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 300 feet from bankfull, either side.
Perennial streams (without native fish)	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 100 feet from bankfull, either side.
Intermittent streams	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 50 feet from bankfull, either side.

Waterbody/Riparian Feature	Riparian Management Zone description
Fen wetlands	<p>The riparian management zone is:</p> <ol style="list-style-type: none"> <li>1) 100-foot slope distance from the edge of the fen wetland; or</li> <li>2) if the zone of influence for a given fen has been determined to be a smaller OR larger distance, this would instead be delineated as the RMZ.</li> </ol> <p>The zone of influence for fen wetlands is defined as the area of groundwater influence that maintains the saturation conditions that inhibit the organic matter (peat) decomposition and allow the peat accumulation.</p> <p><i>See also plan appendix 12 for best available scientific information regarding buffers for fen wetlands.</i></p>
Non-fen wetlands, lakes, and seeps/springs	<p>The riparian management zone consists of one of three criteria, whichever is greatest: 1) the body of water or wetland to the outer edges of the riparian/wetland vegetation; 2) the extent of the seasonally saturated soil; or 3) 100-foot slope distance from the edge of the wetland/water feature OR, for constructed ponds and reservoirs with shorelines composed of riparian vegetation, the maximum pool elevation.</p>
Ephemeral streams and swales	<p>The riparian management zone is 25 feet from the edge of evidence of high-water flow potential for the stream/swale.</p>
Constructed ponds and reservoirs with riparian vegetation	<p>The riparian management zone is the maximum pool elevation.</p>

**FW-STND-RMGD-08:** Vegetation management shall only occur in the riparian management zone if the purpose is to restore or enhance ecological integrity of aquatic and riparian ecosystems. *For vegetation management that meets this standard, see also direction below for constraints on associated ground disturbance.*

**FW-STND-RMGD-09:** Do not authorize crossing fens with equipment. **Exception:** for over-snow crossing, see FW-GDL-RMDG-19.

**FW-STND-RMGD-09.a:** For fen wetlands, do not authorize mechanized excavation activities (filling, dredging, digging) within the zone of influence of the fen wetland. See fen RMZ criteria 2 in FW-STND-RMGD-07. *For unavoidable infrastructure per valid existing rights, see FW-GDL-RMGD-11.a and GDL-RMGD-14.*

**FW-STND-RMGD-09.b:** Within the riparian management zone of fen wetlands, do not authorize:

- permanent or temporary infrastructure, unless the infrastructure is necessary to protect or restore the hydrology and/or chemistry of the fen;
- landings, skid trails, slash piles, burn piles, and staging or decking areas;
- construction of machine fireline;
- fueling activities, equipment maintenance, and the storage of fuels and other toxicants, including that needed for hand equipment;
- chemical applications to vegetation, unless it is necessary to restore wetland-obligate species.

*See also FW-STND-RMGD-09.a regarding excavation activities. For unavoidable infrastructure per valid existing rights, see FW-GDL-RMGD-11.a and GDL-RMGD-14.*

**FW-STND-RMGD-10:** For all stream, wetland and riparian areas established, restored, or enhanced through compensatory mitigation actions associated with a formal In-Lieu-Fee program or other U.S.



Army Corps of Engineers-approved compensatory mitigation program, do not authorize management activities that would impact the functional ecological integrity of the site. Provide long-term site protection, preclude incompatible uses and, as applicable, comply with long-term and adaptive management requirements outlined in all current Project Development Plans associated with compensatory mitigation sites. *For in-lieu fee sites, this direction is required consistent with 33 CFR 332.7(a)(4); see plan appendix 7 for list of potential in-lieu fee sites identified at the time of the forest plan decision.*

**FW-STND-RMGD-10.a:** Reconstructed and new temporary and permanent infrastructure in riparian management zones, as authorized or constructed by the Forest Service (e.g., minimum necessary water impoundments and diversions, culverts, and stream crossings consistent with GDL-RMGD-10.b, -10.c, and -10.e), shall be pre-approved by the Forest Service for the total footprint and method of ground disturbance, with particular emphasis on potential impacts to beaver habitat. *See supporting management approach FW-MA-RMDG-22 regarding interactions with beaver habitat.*

## Guidelines

**FW-GDL-RMGD-10.b and 10.c:** To reduce the likelihood of sediment input to riparian management zones and reduce adverse effects to stream channels and riparian areas, the following activities should be avoided in riparian management zones:

- new temporary roads and the construction of machine fireline, except 1) the minimum necessary for stream crossings or 2) where those activities would contribute to attainment of aquatic and riparian desired conditions.
- new landings, skid trails, slash piles, burn piles, and staging or decking areas,

Exception: 1) applicable only to streams, the minimum necessary for stream crossings or 2) these activities would contribute to attainment of aquatic and riparian desired conditions.

*(More stringent direction is applicable to fens; see instead FW-STND-RMGD-09.b)*

**FW-GDL-RMGD-10.d:** To minimize impacts on riparian ecosystems, install stream crossings that will be in place for more than one season in a manner that sustains bankfull dimensions of width, depth, and slope and keeps streambeds and banks resilient. Instead of pipe, favor bridges, bottomless arches, or buried pipe-arches for those streams with identifiable floodplains and elevated road prisms. Favor armored fords for those streams where vehicle traffic is either seasonal or temporary, or the ford design maintains the channel pattern, profile, and dimension. *For fish-bearing streams, see also STND-AQTC-05. See also FW-GDL-RMGD-10.g regarding permanent crossings.*

**FW-GDL-RMGD-10.e:** To ensure that new *permanent* infrastructure is resilient to climate change and extreme weather events and to minimize impacts to riparian resources, new permanent infrastructure (including but not limited to campgrounds, designated dispersed recreation sites, trails, system roads) should be located outside of the 100-year floodplain. **Exceptions:** 1) the minimum necessary water-related infrastructure for the development of valid existing water rights; 2) the infrastructure is specifically designed to maintain or restore the riparian ecosystem; 3) minimum necessary crossings; and 4) minimum necessary culvert and bridge installation.

**FW-GDL-RMGD-10.f:** To ensure that new *permanent* infrastructure is resilient to climate change and extreme weather events and to minimize impacts to riparian resources, design new permanent infrastructure (including but not limited to campgrounds, designated dispersed recreation sites, trails, system roads) that cannot be located outside of the 100-year floodplain with enough structural mitigation (e.g., deflection structures, flow devices and berms) to withstand 100-year-flood events.

*See supporting management approach FW-MA-RMDG-22 regarding interactions with beaver habitat.*

**FW-GDL-RMGD-11:** To minimize impacts on riparian ecosystems, authorizations for new water diversions and impoundments should require the infrastructure to be the minimum necessary and located and constructed such that their location and operation have minimal impact on the structure, function, composition, and connectivity of riparian management zones. For segments with boating recreation, new water infrastructure should ensure stream connectivity and consider safe passage for boating (e.g., boat chutes on low head dams and proper signage warning of diversion structures). *See also GDL-RMGD-11.a regarding wetlands.*

**FW-GDL-RMGD-11.a:** For unavoidable infrastructure and activity per valid existing rights, to maintain the function of fen wetlands and other wetlands, the GMUG should restrict new authorizations for water diversions, impoundments, and other excavations that would negatively impact wetlands, within the authorities and jurisdiction of the agency. *See also GDL-RMGD-14.*

**FW-GDL-RMGD-12:** To minimize effects to aquatic resources, the following should be located outside of riparian management zones: refueling activities, equipment maintenance, and the storage of fuels and other toxicants (including that needed for hand equipment). **Exception:** For necessary development consistent with other riparian plan direction, if the activity cannot be conducted without refueling or storage within the riparian management zone, locations must be preapproved and have an approved spill containment plan. *(More stringent direction is applicable to fens; see instead FW-STND-RMGD-09.b).*

**FW-GDL-RMGD-13:** To maintain stream temperatures, vegetation projects along streams in the riparian management zone should maintain sufficient stream shade, including retention of large woody debris that interacts with stream flows during base low flow and high-water stages. Future recruitment of adequate large woody debris should be considered in areas where large woody debris is absent or limited. *See also FW-GDL-RMGD-16.*

**FW-GDL-RMGD-14:** To assess potential changes to groundwater-dependent flows (e.g., groundwater flow from springs or water-table elevation in wetlands, including fen wetlands), when authorizing new or reauthorizing existing groundwater developments that may impact such water flows, the Forest Service should require groundwater monitoring to be conducted before and after construction or any relevant reconstruction.

**FW-GDL-RMGD-15:** To reduce the likelihood of sediment input to streams and reduce adverse effects to stream channels and riparian areas, new sand and gravel pit extraction, or placer mining or placer extraction - subject to valid existing rights - should be located outside of the riparian management zone.

**FW-GDL-RMGD-16:** To maintain stream channel stability, aquatic habitat, and floodplain connectivity—provided there would be no assets at-risk—large wood should not be cut or removed from stream channels (including beaver dams). **Exception:** wood threatens critical infrastructure or recreational safety. Pertinent authorizations and permits should require agency approval before wood is removed from streams. *See also FW-STND-RMGD-13.*

**FW-GDL-RMGD-17:** To maintain beaver populations and the ecological functions that beavers provide, management actions should use techniques that sustain beavers (e.g., flow devices to protect infrastructure, using pipes to reduce water levels, and beaver dam analogues), while also mitigating undesired effects of beaver dams. *See supporting management approach FW-MA-RMDG-22 regarding interactions with beaver habitat.*

**FW-GDL-RMGD-GDL-18:** To prevent compaction of fen wetlands, existing and new designated over-snow-vehicle (OSV) routes, permitted over-snow grooming, and other potential sources of

snow compaction that would cross a fen wetland should be evaluated and restricted as necessary. Note: Absolute minimum winter snow conditions for all wetlands are defined in the WCPH at Section 12.4 Management Measure 6: avoid ground vehicles unless protected by at least 1 foot of packed snow.

*See also the range section, guidelines FW-GDL-RNG-12 and FW-GDL-RNG-13 for direction regarding spring developments.*

### **Management Approaches**

**FW-MA-RMGD-18:** Work with the Colorado Natural Heritage Program and other partners to continue to inventory, delineate, characterize and evaluate groundwater-dependent ecosystems (seeps and springs, fens and other wetlands, certain lakes) across the GMUG. Delineate the zone of influence for groundwater sources when analyzing project proposals likely to affect groundwater-dependent ecosystems.

**FW-MA-RMGD-19:** Work with partners to maintain a centralized and comprehensive GIS dataset of the riparian management zone and its constituent features (e.g., streams, fens, at-risk species, native trout species) across the GMUG.

**FW-MA-RMGD-20:** Provide special consideration for large fen wetlands, unusual fen wetlands (e.g., calcareous fen wetlands, iron fen wetlands), fen wetlands in good condition, and fen wetlands known to support at-risk species (*Resistance*).

**FW-MA-RMGD-21:** For climate change adaptation, Rondeau et al. (2020) contains a description of a planning framework and a catalog of additional climate adaptation strategies specifically for seeps, springs, and wetlands, but which are applicable to all riparian and aquatic ecosystems. Revised plan direction supports the following strategies:

- Enhance resiliency of riparian and aquatic ecosystems to climate change by maintaining hydrological connections and processes and restoring or improving the condition of these ecosystems to support a variety of wildlife species and ecosystem services including livestock grazing and recreation. (*Resilience*)
- Manage human uses on the landscape in ways that benefit the hydrologic connections and health of native riparian and aquatic species, e.g., recreation, livestock grazing, energy development, water systems, mining, roads, and research. (*Resilience*)
- Maintain large wood in the floodplain and active stream channels and vegetation cover sufficient to catch sediment, dissipate energy, and prevent erosion. (*Resistance, Resilience*)

**FW-MA-RMGD-22:** Where roads or trails are naturally flooded due to beaver activity, consider a bridge over the stream and wetlands. Effective techniques for preventing culvert plugging include culvert-protective fence, fence and pipe systems, installation of oversized culverts or small bridges, starter dams, and beaver-proof culverts.

### **Watersheds and Water Resources (WTR)**

This section addresses both broader watershed management per Forest Service policy as well as the actual water resource. The interaction of water with species and ecosystems is primarily covered in the preceding sections, *Riparian Management Zones and Groundwater-Dependent Ecosystems* and *Aquatic Species and Habitat*.

*See also direction in the sections Key Ecosystems Characteristics, Transportation, Riparian Management Zones and Groundwater-Dependent Ecosystems, Aquatic Species and Habitat, Rangelands, and the Conservation Watershed Network.*

## Desired Conditions

**FW-DC-WTR-01:** Watershed conditions and the integrity of public water supplies are maintained or improved, and all watersheds achieve or are moving toward properly functioning condition as defined by the national watershed condition framework (or similar protocol).

**FW-DC-WTR-02:** The Forest Service and a wide variety of partners actively coordinate to sustain ecological and hydrologic processes to continue to provide critical water supplies—including water quality—for ecological integrity and to communities and water users. *See also the multiple ecosystem sections and the Forestwide objective for infrastructure, INFR-03.*

**FW-DC-WTR-03:** State of Colorado water quality standards are met, and State-classified uses are supported for all water. Water quality for those listed as impaired or potentially impaired on the State of Colorado 303(d) list and Monitoring and Evaluation list, respectively, move toward fully supporting State-classified uses.

## Objectives

**FW-OBJ-WTR-04:** During each 10-year period following plan approval, develop three watershed restoration action plans and take actions within those plans to trend toward improved watershed conditions, including their chemical, physical, and biological attributes, based upon the watershed condition framework or other accepted protocols. *See also the Forestwide objective for infrastructure, INFR-03 and for riparian management zones and groundwater-dependent ecosystems, RMGD-06. See plan appendix 2 for potential actions to complete this objective.*

**FW-OBJ-WTR-04.a:** Over the life of the plan, ensure that all water rights owned by the Forest Service are put to their decreed beneficial use or are properly disposed of if no longer needed.

## Standards

**FW-STND-WTR-05:** Management activities shall maintain or restore the connectivity, composition, function, and structure of watersheds in the long-term, as consistent with the Watershed Conservation Practices Handbook and its exceptions (FSH 2509.25) and National Core Best Management Practices (FS 990a) or equivalent direction. *See also direction in plan section Riparian Management Zones and Groundwater-Dependent Ecosystems (RMGD).*

## Management Approaches

**FW-MA-WTR-06:** Coordinate across jurisdictions and consult applicable State municipal and source water protection plans prior to authorization of management activities that could affect public source water areas. *(Resistance).*

**FW-MA-WTR-07:** Consider the strategies and actions outlined in the Pathfinder Project (GMUG 2004), which would support: cooperation with Federal, State, Tribal, and local governments, and other stakeholders, regarding water flows that would support riparian resources, channel conditions, aquatic habitat, and associated recreational uses such as fishing and boating *(Resistance).*

**FW-MA-WTR-08:** When reviewing authorizations and reauthorizations for water developments in the GMUG, or the water rights filings of others on National Forest System lands (conditional, absolute, change, augmentation, and exchange), the GMUG's role is to ensure: 1) the appropriate National Forest System land use authorization is in place, 2) the water use development has the appropriate state authorization, 3) that the application will not injure Forest Service water rights and 4) the forest resource is protected to the maximum extent possible. *See also FW-GDL-RMGD-11.a regarding restrictions related to wetlands.*

**FW-MA-WTR-09:** Maintain and update existing water right inventories and acquire water rights for new federal uses in accordance with federal and state law. Review monthly water court resumes and enter into any water court case necessary to protect Forest Service water rights and water-dependent resources.

**FW-MA-WTR-10:** Consider applying a landscape- or watershed-scale approach to restoring aquatic and riparian ecosystems. Use partnerships and integrate restoration activities with other resource programs, especially recreation, range management, and vegetation management to efficiently use limited resources (*Resistance, Resilience*).

**FW-MA-WTR-11:** Progress toward conformance with the State of Colorado Nonpoint Source Management Plan.

## Climate Change and Carbon (CCC)

The plan components in this section and elsewhere in the forest plan will enable future management projects in the GMUG to achieve goals outlined in the 2022 Forest Service Climate Adaptation Plan and related policies, and ensure alignment with GTR-WO-95 (*Janowiak et al 2017, Carbon Considerations in Land Management*) and similar best practices.

*See also the direction in the sections for Key Ecosystem Characteristics (ECO), Riparian Management Zones and Groundwater-Dependent Ecosystems (RMGD), Aquatic Species and Habitat (AQTC), Invasive Species (IVSP), Fire and Fuels Management (FFM), Infrastructure (INFR), Recreation (REC), and Timber and Other Forest Products (TMBR), and plan appendix 13 – Climate Crosswalk.*

## Desired Conditions

*See Forestwide desired conditions in the “Key Ecosystems Characteristics” section, FW-DC-ECO-01, ECO-02 and ECO-03.*

## Management Approaches

*See also the Timber and Fire and Fuels sections for extensive climate change adaptation management approaches specific to vegetation management.* Other explicit climate adaptation strategies are included throughout multiple sections of the plan and, as much as possible for easier reference, labeled with an identifying strategy category of *Resistance, Resilience, or Transition* (see FW-MA-CCC-01 below for more detail).

**FW-MA-CCC-01: Climate Adaptation “Toolbox Approach”:** Managing for ecosystem adaptation in an era of climate change is a complex endeavor with high levels of uncertainty. No single approach will fit all future challenges, and so the best strategy is to mix different approaches for different situations. To bring coherence to all these varied actions, the GMUG will use a “toolbox approach” framework outlined by Millar et al. (2007) and elaborated by Peterson et al. (2011) and Swanston et al. (2016) that conceptualizes three broad categories of adaptation strategies: **Resistance** (actions that forestall impacts and protect highly valued resources), **Resilience** (actions that improve the capacity of ecosystems to return to desired conditions after disturbance), and **Transition** (actions that facilitate transition of ecosystems from current to new conditions).

Throughout this forest plan, management approaches that promote climate adaptation are labeled with the category of adaptation strategy that they best fit (*resistance, resilience, and/or transition*). Some management approaches will include multiple adaptation strategies (e.g., promoting landscape connectivity could enable *resilience* as well as *transition*).

The three strategies of the toolbox approach and their purposes are outlined in table 3, which includes a corresponding example management approach from the GMUG forest plan. “Resistance, Resilience, and Transition” are broad categorizations for the strategies, and project-level climate change strategies will need to be tailored to local conditions.

**Table 3. Strategies of the RRT (Resistance, Resilience, Transition) or “toolbox approach” to ecological risk management for climate adaptation**

[Modified from Millar et al. (2007), Peterson et al. (2011), Swanston et al. (2016).]

Strategy	Purpose	Example Management Approaches
<b>Resistance</b>	To forestall impacts and protect highly valued resources	Increase retention of large diameter trees on sites with low vulnerability to drought stress or sites that otherwise minimize exposure to stressors that could increase tree mortality.
<b>Resilience</b>	To improve the capacity of ecosystems to return to desired conditions after disturbance	Use mapping programs to match seeds (of same species) collected from a known origin to planting sites based on climatic information to optimize recruitment and survival in future climates.
<b>Transition</b>	To facilitate transition of ecosystems from current/historic conditions to new conditions	Remove unhealthy individuals of a declining species to promote other species expected to fare better. Plant tree species expected to be adapted to future conditions and resistant to pests or present pathogens.

**FW-MA-CCC-02: Climate Adaptation Collaborative:** To better understand and address the effects of climate change on the GMUG and to inform adaptation and mitigation strategies during implementation of the GMUG forest plan, participate in an open, voluntary, collaborative effort with universities, Forest Service research stations, non-governmental organizations, Tribal governments, and other interested partners. The science-management collaborative should provide a space for the development and implementation of research, management practices, and monitoring of programs, and enable stakeholders with diverse interests to share knowledge and resources to improve outcomes and enhance decisions. The collaboration would ideally result in a climate adaptation plan for the GMUG.

## Key Ecosystem Characteristics (ECO)

### Structure, Function, and Composition

*See also especially the direction in the section Aquatic Species and Habitat, Riparian Management Zones and Groundwater-Dependent Ecosystems, and Watershed and Water Resources.*

### Desired Conditions

**FW-DC-ECO-01:** Ecosystems contain a mosaic of vegetation age classes, densities, and structures. This mosaic occurs at a variety of scales such as geographic and watershed scales, reflecting the disturbance regimes that naturally affect the area. Natural ecological cycles (e.g., hydrologic, energy, nutrient, disturbance, and carbon cycles) facilitate the shifting of plant communities, structures, and ages across the landscape over time.

**FW-DC-ECO-02:** Ecosystems are resilient to the frequency, extent, and severity of disturbances (such as wildland fire in fire-adapted ecosystems, flooding in riparian systems, insects, and pathogens). Natural disturbance regimes, including wildland fire, are restored where practical and allowed to function in their natural ecological role to enhance resources, including habitat for species associated with fire-adapted systems. Native insect and disease populations are generally at endemic levels with occasional outbreaks, and the scale of insect and disease outbreaks is restricted by variation among vegetation structures. Uncharacteristic disturbances due to climate change are minimal, and management actions mitigate undesirable outcomes of such disturbances. Desired conditions for seral stage distribution and fire regimes by ecosystem are listed in table 4. *See also the Forestwide desired condition and objective for fire and fuels, FFM-01 and FFM-02, for pertinent direction to support this desired condition.*

**Table 4. Desired conditions for seral and structural stage distribution and fire regime by ecosystem at the Forestwide scale**

[Seral stage desired ranges are derived from the output of state and transition models that were developed originally in 2005 for the GMUG and refined in 2018 based on best available scientific information in 2018. To reflect uncertainty in future climate conditions and potential impacts of climate change on disturbance regimes, desired condition ranges are expanded by 5 percent on each end of the state and transition model outputs. As there are limitations in the models used to derive these desired ranges, they are not intended to drive management decisions as an exact target but to serve as a frame of reference. Broadly speaking, the GMUG will manage for heterogeneity in seral and structural stages at a variety of scales across the plan area. Approximate corresponding structural stages are noted in parentheses. For ponderosa pine, seral stages are not readily applicable, rather desired structure and disturbance mechanisms are more appropriate. See *additional supporting best available scientific information and explanation in plan appendix 12*. Additional context can be found in the [Revised Terrestrial Ecosystems Assessment](#) (USDA Forest Service 2018).]

**Table 4a. Forested Ecosystems**

Ecosystem	U.S. National Vegetation Classification Macrogroup	Early Seral (1M, 1T, 2S, 2T)	Early-mid Seral (3A, 3B, 3C)	Late-mid/Late Seral (4A, 4B, 4C)	Fire Severity	Fire Return Interval (years)
Spruce-Fir	M020 Rocky Mountain Subalpine-High Montane Conifer Forest	22–37%	15–29%	38–58%	High	200–500



<b>Ecosystem</b>	<b>U.S. National Vegetation Classification Macrogroup</b>	<b>Early Seral (1M, 1T, 2S, 2T)</b>	<b>Early-mid Seral (3A, 3B, 3C)</b>	<b>Late-mid/Late Seral (4A, 4B, 4C)</b>	<b>Fire Severity</b>	<b>Fire Return Interval (years)</b>
Spruce-Fir-Aspen	M020 Rocky Mountain Subalpine-High Montane Conifer Forest	8–24%	17–34%	43–70%	High	150–300
Aspen	M020 Rocky Mountain Subalpine-High Montane Conifer Forest	3–19%	18–31%	35–72%	Varies	Varies
Lodgepole Pine	M020 Rocky Mountain Subalpine-High Montane Conifer Forest	17–44%	31–45%	18–43%	<9,500 feet, mixed; >9,500 feet, high	<9,500 feet 50–200; >9,500 feet 200–400
Cool-Moist Mixed Conifer	M022 Southern Rocky Mountain Lower Montane Forest	21–38%	15–31%	37–59%	High-mixed	50–200
Warm-Dry Mixed Conifer	M022 Southern Rocky Mountain Lower Montane Forest	15–32%	10–25%	18–29% / 32–40% (fire-maintained open)	Low-mixed	20–50
Ponderosa Pine	M022 Southern Rocky Mountain Lower Montane Forest	N/A	N/A	N/A	Low	10–40
Pinyon-Juniper	M027 Southern Rocky Mountain-Colorado Plateau Two-needle Pinyon - Juniper Woodland	5–19%	24–42%	45–69%	High	200–1,000
Pinyon-Juniper with shrub component	M027 Southern Rocky Mountain-Colorado Plateau Two-needle Pinyon - Juniper Woodland	23–56%	34–48%	4–34%	Low-mixed	35–200
Bristlecone-Limber Pine	M020 Rocky Mountain Subalpine-High Montane Conifer Forest	9–25%	14–25%	46–81%	<10,000 feet= low-mixed/ >10,000 feet= none	<10,000 feet=9–55/ >10,000 feet=NA

**Table 4b. Shrubland Ecosystems**

Shrubland	U.S. National Vegetation Classification Macrogroup	Early (1M)	Early-mid (2S, size S/M)	Late-mid/Late (2S, size L)	Fire Severity	Fire Return Interval (years)
Montane Shrubland, Oak-Serviceberry-Mountain Mahogany	M049 Southern Rocky Mountain Montane Shrubland	12–28%	N/A	72–90%	High	25–50

**FW-DC-ECO-03:** Despite changing and uncertain future environmental conditions, ecosystems maintain all of their essential components and are resilient to climate change. Areas of rapidly changing climate support functioning ecosystems dominated by species native to the context area<sup>1</sup>, though perhaps new to that specific location. Forestwide carbon stocks are resilient and appropriate to environmental conditions. Where necessary, management actions help to transition species composition and vegetation structure, including stand densities, to be resilient to modeled future climate conditions. Incursion of invasive species into new areas is minimal, and they are rapidly detected and removed. Areas of climate refugia are managed for resistance to climate change. Areas of climate refugia continue to support species historically present; have high ecological integrity, are resilient to future conditions, allow for species migration, and have low or no undesirable anthropogenic impacts.

### Objectives

**FW-OBJ-ECO-04:** Within 5 years of plan approval, identify areas of potential climate refugia in the national forests and implement monitoring for a subset of these areas. For assisting identifying areas in the GMUG with high ecological value and relative climate stability, see plan appendix 12, *Footnotes Regarding Best Available Scientific Information for supporting information*. See also associated management approach FW-MA-ECO-04.a.

### Management Approaches

**FW-MA-ECO-04.a:** After climate refugia are identified, work with pertinent partners to develop refugia area management actions such as those for conservation watersheds (OBJ-SPEC-54) and wildlife management areas (OBJ-WLDF-03). (*Resistance*)

### Vulnerable Ecosystems

**FW-MA-ECO-04.b:** The following management approaches for climate-vulnerable ecosystems support the overall *Climate and Carbon* section, management approach FW-MA-CCC-01, as well as the management approaches in the *Timber* and *Fuels* sections. These are sourced from the cited best available science, and categorized according to the agency’s “Resistance, Resilience, Transition” approach to climate adaptation. Note that plan direction throughout the plan supports these

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<sup>1</sup> As defined in the GMUG Terrestrial Ecosystems Assessment, the context area is 20 million acres surrounding and including the GMUG, delineated by ECOMAP subsections (Cleland et al. 2007).

management approaches via desired conditions, specific objectives, standards, and guidelines. *See plan appendix 13 for a crosswalk between best available scientific climate adaptation strategies and Forestwide direction.*

- **Alpine Ecosystems:** Refer to the [Climate Change Adaptation Library for the Western United States](#) or other best available scientific information to identify additional adaptation strategies for alpine ecosystems. Highlights include:
  - Identify, protect, and monitor areas where alpine vegetation is expected to persist (climate refugia); *see FW-OBJ-ECO-04*. Increase connectivity around habitat islands to promote movement corridors and ecosystem resiliency, with an emphasis on recreation management; *see FW-OBJ-REC-04. (Resistance, Resilience)*
  - Consider management actions that maintain snowpack location and duration, given the impacts of reduced snowpack and warmer temperatures to distribution and abundance of plant species, changes in amount and timing of seasonal runoff, recreational access and use, and wildlife populations. *(Resilience)*
  - Accept the possibility that alpine areas will decrease in size under climate change and concentrate management efforts in high priority areas, such as areas with at-risk and other special status species. Monitor tree establishment and potential shift in subalpine spruce-fir communities into alpine areas. *(Transition)*
- **Bristlecone and Limber Pine Landscapes:** Increase population size and age class diversity of bristlecone and limber pine through the following practices to maintain maximum possible resilience and offset future mortality due to white pine blister rust *(Resilience)*:
  - plant limber pine seedlings with quantitative resistance,
  - plant local bulked seed lots of bristlecone pine,
  - plant both species in both current and future suitable habitat (e.g., outside of current distribution), and
  - reduce competitor density around bristlecone/limber pine to increase cone production near disturbances to support natural regeneration.
- **Pinyon-Juniper Landscapes:** Refer to Rondeau et al. (2017a) for a description of a planning framework and a catalog of additional adaptation strategies for the pinyon-juniper landscape. Highlights include:
  - Protect and maintain large, interconnected, functional, and resilient pinyon-juniper landscapes that support persistent populations of pinyon-juniper obligate species. *(Resistance, Resilience)*
  - Maintain land management practices that support sustainable human use of pinyon and juniper services, e.g., nut harvest and juniper posts. *(Resilience)*
  - Accept that some species are vulnerable and difficult to maintain in their current site. When possible, allow and assist migration into upper elevation zones that do not currently support pinyon and juniper, as well as retreat from areas that are unlikely to have a suitable climate for pinyon-juniper regeneration. *(Transition)*
- **Sagebrush Landscapes:** Refer to Rondeau et al. (2017b) for a description of a planning framework and a catalog of additional adaptation strategies for the sagebrush landscape. Highlights include:

- Identify and manage 1) areas of sagebrush habitat for at-risk sagebrush obligate species and 2) sagebrush refugia – areas where it is expected that sagebrush shrubland will persist under climate change. *See FW-OBJ-ECO-04 and accompanying management approach. (Resistance)*
- Improve and maintain ecological processes and condition across the landscape such that outcomes support a variety of sagebrush-obligate and other species and land-based livelihoods such as livestock grazing, while managing invasive species and reducing erosion and water loss. *(Resilience)*
- **Seeps, Springs, Wetlands, and other Riparian and Aquatic Ecosystems (the Riparian Management Zone):** *See the section Riparian Management Zones and Groundwater-Dependent Ecosystems (RMGD).*
- **Spruce-Fir Landscapes:** Refer to Rondeau et al. (2017c) for a description of a planning framework and a catalog of additional adaptation strategies for the spruce-fir landscape. Highlights include:
  - Protect and monitor existing patches and linkage areas of spruce-fir forests to support at-risk species and rare species that are dependent on spruce-fir, including plants. *(Resistance)*
  - Manage the system so that it can respond to change and is less vulnerable to drought and changes in forest composition from disturbance (e.g., wildfire, insect outbreaks). *(Resilience)*
  - Use an adaptive approach to managing spruce-fir populations depending on climatic suitability and response to disturbance. Consider embracing major changes, such as expanding aspen stands or shifting to climate-adapted vegetation communities. *(Transition)*

## Connectivity

### Desired Conditions

**FW-DC-ECO-05:** Vegetation connectivity, configuration, and abundance provide for genetic exchange, maintain or enhance migration corridors for daily and seasonal movements of animals, including migratory pollinators, and predator-prey interactions across multiple spatial scales, including adjacent lands in the broader landscape. Habitat configuration and availability and species genetic diversity allow long-distance range shifts of native plant, wildlife, fish, and insect populations, in response to changing environmental and climatic conditions. Conditions provide for the life history, distribution, and natural population fluctuations of species within the capability of the ecosystem.

*See also the Forestwide desired condition for Native Species Diversity SPEC-01, SPEC-32, as well as OBJ-SPEC-03 and DC-SPEC-12.*

## Snags and Coarse Wood

### Desired Conditions

**FW-DC-ECO-06:** Vegetation protects soil, facilitates moisture infiltration, and contributes to nutrient cycling. Vegetation characteristics (e.g., tree density, litter depth) support favorable water flow and quality. Coarse and fine woody debris and snags occur at levels sufficient to support soil productivity and wildlife habitat, with a range of sizes and decomposition levels of woody debris. *See also the Forestwide guidelines for ecosystems ECO-08 and soils SOIL-06.*

## Guidelines

**FW-GDL-ECO-07:** To maintain ecological integrity, soil productivity, and persistence of associated native species, vegetation management activities should retain at least the minimum snag levels and the lower end of the optimal downed wood and coarse woody debris levels noted in table 5.

Exceeding the upper end of the optimal range of downed wood or coarse woody debris is acceptable if not contradictory to project objectives (e.g., fuels reduction). *For mapped lynx habitat, there are more stringent requirements—the upper end of these values must be retained; see table 5 footnotes 2 and 4 and SRLA standard ALL S1 in plan appendix 4.*

*See also related direction for large tree retention for cavity-nesting species at FW-GDL-SPEC-11.*

**Exception 1:** Higher amounts of snags should be retained during post-disturbance salvage operations to a level sufficient to meet the purpose of the guideline for associated species habitat, as analyzed at the project level. This may lead to coarse woody debris levels higher than the identified optimal range in table 5. Exception 1 not applied to the wildland-urban interface, per Exception 2.

**Exception 2:** To mitigate wildfire impacts to the wildland-urban interface and to other values at-risk on the landscape, the minimum snag and coarse woody debris levels do not apply to 1) the wildland-urban interface, as defined and analyzed in the environmental impact statement for the forest plan; 2) fuels reduction immediately proximal to infrastructure (e.g., water developments, developed recreation sites, roads for egress) and other values at-risk (e.g., cultural sites); and 3) strategic fuel breaks requiring intensive fuels reduction.

**Table 5. Minimum snags, downed wood, and coarse woody debris levels for ecological integrity, soil productivity, and associated species habitat**

[Coarse woody debris is typically defined as dead standing and downed pieces larger than 3 inches in diameter (Harmon et al. 1986), which corresponds to the size class that defines large woody fuel (Brown et al. 2003). Asterisk (\*) indicates associated native species that are at-risk.]

Forest Ecosystem	Minimum Number of Snags per 100 Acres and Minimum DBH <sup>1</sup>	Range of Downed Wood (woody material greater than 3-inch diameter) <sup>2</sup> (tons per acre)	Optimal Range of Coarse Woody Debris (snags plus downed wood) (tons per acre) <sup>3</sup>	Associated At-Risk* and Other Native Species
Spruce-Fir	≥ 400 (15 inch)	8–40 <sup>4</sup>	10–50 <sup>4</sup>	Snags: American marten, boreal owl, flammulated owl, black bear, osprey Downed Wood: American marten, Canada lynx*, snowshoe hare
Spruce-Fir-Aspen	≥ 400 (15 inch)	5–40 <sup>4</sup>	10–50 <sup>4</sup>	Snags: American marten, boreal owl, flammulated owl Downed Wood: American marten, Canada lynx*, snowshoe hare
Aspen	≥ 500 (10 inch)	5–15	10–30	Snags: Purple martin, black bear
Lodgepole Pine	≥ 300 (10 inch)	5–15	10–30	Snags: American marten (and downed wood), boreal owl, flammulated owl, osprey, Williamson's sapsucker
Ponderosa Pine	≥ 300 (13 inch)	5–10	10–25	Snags: Fringed myotis, flammulated owl, black bear, osprey, Lewis's woodpecker, Williamson's sapsucker

Forest Ecosystem	Minimum Number of Snags per 100 Acres and Minimum DBH <sup>1</sup>	Range of Downed Wood (woody material greater than 3-inch diameter) <sup>2</sup> (tons per acre)	Optimal Range of Coarse Woody Debris (snags plus downed wood) (tons per acre) <sup>3</sup>	Associated At-Risk* and Other Native Species
Warm-Dry Mixed Conifer	≥ 300 (13 inch)	5–10	10–25	Snags: <i>Fringed myotis</i> , black bear, flammulated owl, Lewis's woodpecker, Williamson's sapsucker
Cool-Moist Mixed Conifer	≥ 400 (13 inch)	5–40	10–50	Snags: American marten, boreal owl, flammulated owl, black bear, Lewis's woodpecker, Williamson's sapsucker Downed wood: American marten and Canada lynx*
Pinyon-Juniper	≥ 100 (10 inch)	1–5	5–20	Snags: <i>Fringed myotis</i> , Lewis's woodpecker
Bristlecone-Limber Pine	≥ 200 (12 inch)	2–10	5–20	Snags: <i>Flammulated owl</i>

<sup>1</sup> DBH is the diameter of the snag at breast height. Snag height should be a minimum of 25 feet, except in pinyon-juniper ecosystems where this height is generally not achieved. At least 50 percent of the snags retained should represent the largest size classes available, not just the minimum identified here. If larger snags are not present, a greater number in the smaller size classes should be retained.

<sup>2</sup> Lower end value is the minimum, except in Canada lynx habitat where the maximum must be retained (See SLA standard ALL S1 in plan appendix 4). During project implementation, leave larger and longer logs onsite, including in riparian management zones as applicable, based on site capability. A wide variety of downed wood size classes and decay is preferred. See also direction for riparian management zones at FW-STND-RMGD-08 and FW-GDL-RMGD-13 and the restoration objective FW-OBJ-RMGD-06.

<sup>3</sup> A wide variety of snags and downed wood throughout the plan area is preferred, in terms of abundance, distribution, juxtaposition, and condition (degree of decay), commensurate with the capability of the land (Garbarino et al. 2015). Optimal ranges of coarse woody debris represent a range to best meet most resource needs, in terms of acceptable risks of fire hazard and fire severity (outside of the wildland-urban interface), while providing desirable quantities for soil productivity, soil protection, and wildlife. Optimal ranges of coarse woody debris in the above table are based on broad ranges from Brown et al. (2003) of 5 to 20 tons per acre for warm dry forest types and 10 to 30 tons per acre for all other types, with some changes made based on Forest Service staff knowledge of local ecosystems and conditions. The optimal range may be accomplished at the project level by managing for a combination of either higher snag amounts and lower downed wood amounts or lower snag amounts and higher downed wood amounts, depending on the purpose, need, and objectives of the project and existing conditions—but the minimum levels identified for snags, downed wood, and coarse woody debris should still be retained.

<sup>4</sup>In Canada lynx habitat, the upper end of these values must be retained. See SLA standard ALL S1 in plan appendix 4.

Other Notes: Compliance with minimum levels will be measured at the scale of the project footprint; if project footprint is below 100 acres, the minimum would be measured within an encompassing area of 100 acres. Snags do not need to be retained on every acre, and vegetation management will result in a heterogeneous landscape, but minimum levels should be retained as averaged over 100 acres OR as needed to meet the purpose of the guideline for species persistence as identified in project-level analysis. If determined in project-level analysis that average retention over a larger scale would still meet the purpose of the guideline, minimum levels may be averaged over a larger scale (e.g., thousands of acres).

## Old Forest

### Desired Conditions

**FW-DC-ECO-08:** Old forest, as defined and characterized by ecosystem in plan appendix 6, are well-distributed within all forested ecosystems, and occur in amounts and patch sizes needed to support species that depend on old forest characteristics. Old forest contributes to ecosystem integrity, provides habitat for associated species, serves as an important reservoir for carbon, and

contributes to overall ecosystem biodiversity. Natural disturbance processes continue to influence old forest conditions. *See plan appendix 6 for old forest characteristics in the GMUG.*

*See also old-forest related plan direction FW-GDL-ECO-07 and FW-GDL-SPEC-11.*

### **Management Approaches for Old Forest**

**FW-MA-ECO-08.a:** Use available data (remotely sensed products and existing forest inventory) to improve spatial inventory of old forest and potential old forest in the GMUG.

**FW-MA-ECO-08.b:** On a landscape scale, prioritize retention of old forest characteristics that provide habitat for at-risk species, that has limited access, or is considered to be climate refugia (*Resistance*).

### **Fire and Fuels Management (FFM)**

As noted in the *Revised Terrestrial Ecosystem Assessment*, fire is a natural part of the ecosystems in the GMUG, though factors such as a lengthening fire season and hotter, drier conditions due to climate change and an accumulation of fuels have increased the potential for larger and more severe fires. Fire management strives to balance the natural role of fire while minimizing the negative impacts from fire on values to be protected, especially in the wildland-urban interface. This can be accomplished by implementing a coordinated risk management approach to promote landscapes that are resilient to fire-related disturbances and preparing for and executing a safe, effective, and efficient response to fire.

As much as possible in the context of a changing climate, fuels treatments in the GMUG will balance 1) restoring and maintaining natural fire regimes, with 2) reducing the risk of wildfire to community values-at-risk, air quality, watershed health, wildlife habitat, and long-term forest carbon storage. Particularly as wildfires become more uncharacteristic or severe due to climate change, the best available scientific information will be used to determine desired fuels conditions on the landscape. While natural fire regimes are typically desired, climate change is quickly pushing ecosystems beyond fire regimes considered to be “natural” or historic.

Fuels management contributes to ecological restoration and climate change adaptation in the GMUG by using prescribed fire to mimic natural ecological processes in fire-adapted ecosystems and by using mechanical treatments to reduce fuels and create ecosystem conditions where future wildland and prescribed fires can be managed for ecological benefit. As climate change continues to contribute to atypical fire behavior, proactive fuels management is crucial to minimize the potential for uncharacteristic, climate change-exacerbated wildfire to act as an ecosystem stressor and threat to long-term forest carbon storage. *See also the [Revised Terrestrial Ecosystem Assessment](#) for best available scientific information regarding the need for additional fire on the landscape, the potential for it to act as both a driver and a stressor, and fire regimes by ecosystem.*

The GMUG combines local fire knowledge with advanced spatial analytics to develop a common understanding of risks, management opportunities, and desired outcomes to determine fire management objectives and to plan and prioritize fuel management projects.

Wildland fires may be managed to burn with the intensity and frequency of the reference fire regime when fire weather conditions are appropriate, and resources are available to successfully meet objectives. Firefighter and public safety are prioritized when determining the appropriate wildland fire response, and other factors such as fuel conditions, weather (current and expected), existence of natural or constructed barriers, values present (e.g., infrastructure—including, but not limited to, municipal water infrastructure, archeological sites, terrain, and private land) are incorporated into the calculus of how the wildland fire would be managed. Specialists are consulted to ensure that



resources present (e.g., municipal water infrastructure, critical habitat, watershed health, and commercial timber value) are identified and existing direction (including forest plan direction) is considered.

For planned ignitions, such as a prescribed burn, existing direction (including forest plan direction) and site-specific conditions (e.g., air quality, resources present, and current and desired ecological conditions) are considered through project-level analysis. This process, which includes opportunities for public participation, determines how the project can achieve site-specific objectives, contributes to forest plan desired conditions, and complies with existing law, regulation, and policy (, Clean Air Act, FSM 5140).

Note: Many local communities have community wildland fire protection plans that have variously identified wildland-urban interface; collaboration with local stakeholders to refine and utilize an appropriate buffer from infrastructure and private land would be considered in the site-specific design and environmental analysis of fuels reduction projects.

### **Desired Conditions**

**FW-DC-FFM-01:** Life, investments, and valuable resources including fire's sensitive natural resources are protected. Wildland fires in the wildland-urban interface and near infrastructure primarily exhibit surface fire behavior with flame lengths typically less than 4 feet; the potential for torching, crowning, and spotting, as well as the resistance to control, are low. Redundant natural and manmade barriers are present and strategically located on the landscape to provide both defensible space and safe locations for firefighters to be successful with management efforts.

**FW-DC-FFM-01.a:** In fire-adapted ecosystems, periodic use of fire creates conditions that reduce mortality from uncharacteristic wildfire, and promotes forest structure and composition that meet a variety of ecosystem services, including forest products and carbon uptake and storage.

*See also the Forestwide desired condition for Key Ecosystem Characteristics, ECO-02.*

### **Objectives**

**FW-OBJ-FFM-02:** To move toward desired ecological conditions (*see Key Ecosystem Characteristics section*) and reduce the risks and negative impacts of uncharacteristic wildland fire, treat approximately 110,000 acres in the first decade of plan implementation, and 150,000 acres in the second decade, through the implementation of vegetation management techniques, including the use of wildland fire (planned and unplanned) and mechanical methods (e.g., thinning of ladder fuels and mastication). *See plan appendix 2 for examples to accomplish this objective.*

### **Guidelines**

**FW-GDL-FFM-03:** To reduce impacts from suppression activities, existing best management practices for minimum impact suppression should be used where more sensitive resources are present, including, but not limited to, at-risk species habitat, cultural resources, and native fish streams.

*See also Forestwide standards and guidelines especially pertinent to fire and fuels management: FW-GDL-IVSP-07.a, FW-GDL-IVSP-08, FW-GDL-IVSP-08.a, FW-GDL-RMGD-10.b and -10.c; FW-GDL-RMGD-12; FW-GDL-IVSP-05.c, FW-GDL-SPEC-23, FW-GDL-SPEC-31 and FW-STND-CHR-04.*

*See also management area direction for recreation emphasis areas, EMREC-01 and 07, regarding the role of vegetation management in these locations.*

## Management Approaches

**FW-MA-FFM-04:** Prescribed fire and use of wildfire have been and will continue to be important management tools in sustaining ecological integrity of fire-adapted ecosystems in the GMUG in the future. Prescribed fire and the use of wildfire to achieve land management objectives can be appropriate tools to treat and restore vegetative composition, structure, and function where fire is a primary natural disturbance (*Resistance, Resilience*).

**FW-MA-FFM-05:** Enhance relationships with municipal and agricultural water providers to ensure water use-related structures are considered in updates to Community Wildfire Protection Plans (CWPP) and wildland fire decisions.

**FW-MA-FFM-06:** Work with partners to prioritize fuels treatments to protect existing transportation and water-use related infrastructure, as informed by the *GMUG Watershed Vulnerability Assessment* (USDA Forest Service 2013a) (*Resistance, Resilience*). This assessment identified the following, in summary:

- Subwatersheds where transportation infrastructure and water use-related structures (dams, reservoirs, ponds, ditches, diversions) are most vulnerable are in the San Juans and Upper Taylor Geographic Areas (p. 106). Nine subwatersheds in the San Juans are rated as the most high-risk (339,700 acres); three subwatersheds encompassing an even larger area (476,900 acres) are identified as the most high-risk in the Upper Taylor Geographic Area (p. 110).
- This management approach supports desired conditions for infrastructure that is resilient to climate change and extreme weather events (FW-DC-INFR-02), to reduce the risks and negative impacts of uncharacteristic wildland fire to existing infrastructure (FW-OBJ-FFM-02), and to implement actions to reinforce existing infrastructure to withstand such events (FW-OBJ-INFR-03).

**FW-MA-FFM-07:** Adjust prescribed fire and other fuels reduction to respond to trends in climate influences, such as extended droughts and warming temperatures (*Resistance, Resilience, Transition*).

**FW-MA-FFM-08:** Manage fuels to avoid permanent forest conversion to non-forest from either management activities or uncharacteristic wildfire. However, climate change adaptation may warrant accepting some type conversions to non-forest or even the managed facilitation to non-forest (*Resistance, Resilience, Transition*).

**FW-MA-FFM-09:** When implementing post-fire restoration actions, work with partners to help recovering ecosystems adapt to changing climate conditions. This may include strategies to facilitate transitions to ecosystems that are better adapted to future climates. *See complementary management approaches for regeneration and replanting in the Timber section, especially FW-MA-TMBR-16, 17, 18. (Resilience, Transition).*

**FW-MA-FFM-10:** Communicate regarding smoke management from prescribed fires on the GMUG using principles and actions outlined in the National Wildfire Coordinating Group's Smoke Management Guide for Prescribed Fire (NWCG 2022), and/or other best management practices. Coordinate public communication and education efforts regarding fire and fuels with local governments, Tribes, and partners.

## **Invasive Species – Terrestrial and Aquatic (IVSP)**

### ***Desired Conditions***

**FW-DC-IVSP-01:** Terrestrial and aquatic native plant communities composed of a diverse mix of native grass, forb, shrub, riparian, and tree species dominate the landscape, while invasive plant and animal species, including aquatic nuisance species, are nonexistent or low in abundance and do not disrupt ecological function.

### ***Objectives***

**FW-OBJ-IVSP-02:** Annually, invasive species management actions are completed on at least 2,000 acres so that new infestations are prevented; densities of existing infestations are reduced; total acres or areas infested are reduced; infested areas are restored/rehabilitated; existing infestations are contained, controlled, suppressed, or eradicated depending on infestation characteristics (e.g., size, density, species, location), management opportunities, and resource values at-risk; and uninfested areas are maintained or protected. *See also below management approaches for priority treatments and best practices.*

### ***Standards***

**FW-STND-IVSP-03:** For all proposed activities, associated risk of invasive and aquatic nuisance species introduction or spread shall be mitigated using best management practices and integrated pest management practices (USDA Forest Service 2013b) that are commensurate with the potential risk, including but not limited to decontamination procedures on vehicles and equipment and the use of weed-free products. *See also guidelines IVSP-07.a, IVSP-08.a, and SPEC-23 for aquatic-related equipment decontamination requirements.*

**FW-STND-IVSP-04:** Contracts and permits for activities in the national forests, including facility maintenance and leases, shall include best management practices to prevent associated introduction and spread of invasive plant and aquatic nuisance species. *(See USDA Forest Service. National Strategic Framework for Invasive Species Management. FS-1017, August 2013).* Examples of mitigation include using decontamination procedures on vehicles and equipment, using weed-free products, and reseeding with native plant species. *See also guidelines IVSP-07.a, IVSP-08.a, and SPEC-23 for aquatic-related equipment decontamination requirements.*

**FW-STND-IVSP-05:** The Forest Service shall require the inspection by a certified inspector of watercraft (motorized and non-motorized, unless on the exempt list), or restrict or prohibit use of such watercraft on water bodies identified as at-risk for aquatic nuisance species by Colorado Parks and Wildlife guidelines.

### ***Guidelines***

**FW-GDL-IVSP-06:** To prevent the spread and establishment of invasive plant species following surface-disturbing activities, areas identified as needing mitigation should be reseeded at the optimal time for optimal native revegetation per site-specific characteristics. Reseeding should be done with a mixture of plant species native to the context area, capable of establishment, and should include species preferred by pollinators. *See also the Pollinator section.*

**FW-GDL-IVSP-07:** To prevent incidental mortality to at-risk plant species, if invasive species treatments are planned in an area close enough to affect at-risk plant species, the treatments should

be limited to highly targeted spot treatments. These targeted treatments should only be conducted if of benefit to the at-risk plant species in the long-term.

**FW-GDL-IVSP-07.a:** To prevent the spread of whirling disease, for authorized equipment crossing or operating directly in streams, site-specific analysis should determine whether treatment with biocide such as HDQ Neutral is appropriate. Also apply this guideline to the extent possible during wildland fire operations.

**FW-GDL-IVSP-08:** To prevent incidental mortality of at-risk aquatic species and to minimize the spread of aquatic nuisance species and aquatic pathogens, aircraft dip sites, drafting locations, and water drops should 1) avoid operating in areas documented to be free of aquatic nuisance species and aquatic pathogens and 2) be conducted outside of subwatersheds with known occurrences of at-risk aquatic species (both Species of Conservation Concern and federally listed species). If these subwatersheds are unavoidable, then operations should 1) avoid application of water in subwatersheds where there is no documented chytrid fungus *Batrachochytrium dendrobatidis* (to protect the at-risk western toad), and 2) avoid transferring water from areas with documented whirling disease to those that are disease-free (to protect native trout). **Exception:** critical emergency operations cannot avoid these locations. *See also guidelines IVSP-07.a, IVSP-08.a, and SPEC-23 for aquatic-related equipment decontamination requirements.*

**FW-GDL-IVSP-08.a:** To minimize the spread of invasive species including aquatic nuisance species and pathogens, fire suppression activities should follow standard equipment decontamination protocols. *For specific aquatic-related decontamination requirements, see FW-GDL-SPEC-23 to protect the at-risk western toad and FW-GDL-IVSP-07.a to protect native trout.*

**FW-GDL-IVSP-09:** To prevent the introduction of invasive plant species, gravel and other soil or fill products placed on National Forest System lands should be sourced from pits that implement invasives control mechanisms.

## Management Approaches

**FW-MA-IVSP-10:** Use an all-lands approach to strategically implement invasive species management, utilizing existing coordinated weed management areas. Integrate Forest Service recreation staff and recreation partners into the management of existing coordinated weed management areas to address priority invasive species problems more fully.

**FW-MA-IVSP-11:** Consider the following priorities to implement FW-OBJ-ISVP-02:

- Early treatment of new infestations so that they are eradicated before becoming entrenched.
- Annual treatment of administrative sites until populations are eradicated.
- Treatment of cheatgrass in sagebrush, particularly Gunnison sage-grouse designated critical habitat. *See also the Forestwide objective for native species diversity SPEC-03.*
- Treatment of infestations that are or have the potential to negatively impact at-risk species.
- Piscicide treatments conducted by Colorado Parks and Wildlife to remove invasive fishes from identified watersheds to facilitate cutthroat trout restoration efforts.
- In Conservation Watershed Networks; research natural areas; eligible wild, scenic, and recreational river areas.

**FW-MA-IVSP-12:** Promote early detection and rapid response as an effective approach to minimize spread of invasive species (*Resistance*).

**FW-MA-IVSP-13:** To increase awareness, educate partners and visitors of the potential risk of pathogen transmission to native plants and animals (e.g., recreation pack goats and bighorn sheep, the need to decontaminate wading boots to reduce spread of chytrid fungus or whirling disease).

**FW-MA-IVSP-14:** To support implementation of GDL-IVSP-07, consider the following best management practices: For field-going personnel, provide training to identify at-risk plants and maps of known at-risk plant occurrences; calibrate equipment; and consider and account for wind speed and herbicide volatility during application (Hopwood et al. 2015).

**FW-MA-IVSP-15:** Conduct weed treatments with the most effective approved options available (chemical, mechanical, cultural, and biological), including the use of targeted grazing per vegetation management livestock use permits. *See FSM 2200, chapter 2230, section 2234.18 and FSH 2209.13, chapter 40, section 41.8, Livestock Use Permits).*

## Native Species Diversity (SPEC)

### General Species Diversity

#### Desired Conditions

**FW-DC-SPEC-01:** Forest management provides for native species persistence and movement within and among National Forest System parcels as well as adjacent lands in the broader landscape. Disturbance of species by management activities and recreation is managed to minimize impacts during critical life history periods (e.g., breeding, feeding, rearing young, and migrating), contributing to the persistence of native species. Ecological conditions sustain most common and uncommon native species. *See also the Forestwide desired condition for the connectivity of ecosystems, ECO-06 for related habitat direction that applies to all native species.*

**FW-DC-SPEC-02:** Forage availability is maintained or increased, where capable, and contributes to ecosystem resiliency and forage for native species and desirable non-native species, including livestock.

#### Objectives

**FW-OBJ-SPEC-03:** During each 10-year period following plan approval, restore or enhance at least 50,000 acres of habitat.

Priority treatment areas should include, but are not limited to, Wildlife management areas (MA 3.2), aspen, riparian areas, ecotones, winter range in pinyon-juniper communities, migration corridors and other connectivity areas, designated critical habitat, and other habitat for at-risk GMUG species. *See plan appendix 2 for proposed and possible actions, and also the desired condition for wildlife management areas, MA-DC-WLDF-01.*

**FW-OBJ-SPEC-04:** During the first 5 years following plan approval, install vent pipe screens on all existing restrooms at developed or dispersed recreation sites to prevent bird entrapment.

*See also FW-OBJ-CHR-03 regarding mapping oshá populations, which are of special concern for Tribes in the planning area.*

#### Standards

**FW-STND-SPEC-05:** To prevent bird entrapment, vent pipe screens must be included on pertinent new and reconstructed facilities. Include the specifications for installing vent pipe screens as part of the engineering plans.

#### Guidelines

**FW-GDL-SPEC-06:** To conserve wildlife and aquatic species habitat connectivity and restore natural hydrologic function, constructed features (e.g., exclosures, water developments fish barriers, range improvements, fences, roads, trails, and culverts) should be maintained to support the purpose(s) for which they were built and removed when no longer needed or modified to provide benefits to wildlife. New infrastructure should be designed to maintain, improve, or at a minimum reduce impacts to habitat connectivity, and as recommended by Colorado Parks and Wildlife (Hanophy 2009) and other best available scientific information. *See also the Forestwide standard for aquatic ecosystems, AQTC-05.*

**FW-GDL-SPEC-07:** To minimize habitat impacts and direct disturbance of raptors and migratory birds during nesting and winter periods from new authorizations and management activities, use buffers and timing restrictions based upon Colorado Parks and Wildlife Recommended Buffer Zones and Seasonal Restrictions for Raptors (2020) or alternative best available scientific information. Effective site-specific topographic barriers may be used to modify these buffers.

### **Management Approaches**

**FW-MA-SPEC-07.a:** Communicate, collaborate, and cooperate with other agencies, Tribes, partners, and private landowners to encourage resource protection and restoration of ecological conditions that benefit wildlife, fish, and plants across ownership boundaries. Seek opportunities to work with other land managers and private landowners to improve connectivity to large contiguous blocks of habitat (>500 acres).

**FW-MA-SPEC-07.b:** Coordinate with the Federal Highway Administration, Colorado Department of Transportation, Colorado Parks and Wildlife, other Federal land management agencies, local communities, and stakeholders to identify priority linkage areas (Beier et al. 2008; Hootor et al. 2007; Meiklejohn et al. 2010) and improve habitat connectivity, reduce wildlife-vehicle collisions, provide for aquatic organism passage, and increase highway permeability.

**FW-MA-SPEC-07.c:** When managing trails and considering new trails, use Colorado's Guide to Planning Trails with Wildlife in Mind (Colorado Trails with Wildlife in Mind Taskforce, 2021). This guide, and other best practice guides, are resources that the GMUG National Forests should use to contribute to sustainable recreation management and wildlife conservation.

### **Aquatic Species**

*See sections above for direction for "Aquatic Species and Habitat" (AQTC) and the "Conservation Watershed Network" (CWN) within the larger section, "Aquatic Species and Habitat, Riparian Management Zones and Groundwater-Dependent Ecosystems, and Watersheds and Water Resources." Species-specific direction for at-risk aquatic species (e.g., western toad) can be found in the At-Risk Species section below.*

### **Terrestrial Species**

#### **Pollinators**

##### **Desired Conditions**

**FW-DC-SPEC-08:** Composition and phenology of native plant communities provide floral resources and nesting sites and materials to support native pollinator species and allow effective pollination as an ecosystem service. *See also the Forestwide standard for lands and special uses LSU-06 regarding apiaries.*

##### **Management Approach**

**FW-MA-SPEC-08.a:** When possible, use pollinator-friendly and climate-smart seed mixes in restoration and revegetation projects to support native pollinator species and increase resilience to future climate conditions (*Resilience*).

## ***Bats and Other Cavity-Dependent Species***

*See the Forestwide desired condition for ecosystem connectivity, ECO-06.*

### **Desired Conditions**

**FW-DC-SPEC-08.b:** Caves and cave-like habitats provide the ecological conditions to support bat populations and are free from human-introduced diseases.

### **Objective**

**FW-OBJ-SPEC-08.c:** Within 2 years of plan approval, in order to limit the potential for introduction and spread of disease to caves and mines used by bats, coordinate with Colorado Parks and Wildlife and other partners to provide public education materials regarding best management practices for the public and permittees, including on existing signage at open abandoned mine sites. While there are few caves on the GMUG, provide public education materials for recreational caving users regarding the risk of spreading the fungus that causes white-nose syndrome or other emergent diseases on caving equipment and clothing and to take appropriate prevention measures.

### **Standard**

**FW-STND-SPEC-08.d:** Require the [national white-nose syndrome decontamination protocol](#) for authorized activities with potential to enter abandoned mines, subterranean or cave-like habitats. *See public education objective FW-OBJ-SPEC-08.c and management approach for recreational users.*

### **Guidelines**

**FW-GDL-SPEC-09:** To meet the habitat needs for bats, mine closures should allow for bat access when it has been determined the mine supports or has the potential to support bat roosting, hibernacula, or maternity colonies. *See associated management approach FW-MA-11.a regarding restricting public access to these mines for purposes of maintaining the persistence of bats as well as public safety.*

**FW-GDL-SPEC-09.a:** To preserve natural airflow in and out of occupied cave and abandoned mine entrances and passages that support persistence of bat populations on the GMUG, avoid actions that may adversely alter the cave microclimate (e.g., back-filling of cave entrances, modifying sinkholes, installing solid entrance gates or other structures that modify airflow patterns, and digging in cave passages). **Exception:** These restricted methods are required to ensure public safety.

**FW-GDL-SPEC-10:** To maintain habitat and reduce disturbance by human activities where confirmed bat use and concentrations of bats occur (e.g., maternity colonies, hibernacula, or seasonal roosts), seasonal or permanent access should be limited. These habitats generally include abandoned mines, caves, and other known identified features (dates could change based on best available scientific information):

- Maternity sites: April 15 through September 1
- Swarming sites: August 15 through October 15 (30 minutes before sunset to 30 minutes after sunrise)
- Winter hibernacula: October 15 through May 15.

**FW-GDL-SPEC-11:** To maintain population persistence and nesting habitat for the guild of cavity-dependent species (e.g., bats, owls), active management should maintain larger dead and live trees within residual patches. These patches should be scattered throughout the treatment area where



feasible, and the total extent retained should be determined during site-specific analysis to meet the purpose of the guideline for cavity-dependent species. **Exceptions:** treatments to manage for a specific vegetation type that has a basal area of less than 30 square feet per acre (e.g., rangeland); best available science supports management and restoration for at-risk species that conflicts with this guideline; for the removal of hazard trees due to public or operational safety concerns; or disease and/or insect outbreaks in a stand constitute a threat to the health of the surrounding forest. *See also GDL-ECO-07 regarding minimum snags and sizes by cover type and DC-ECO-08 regarding old forest.*

## Management Approaches

**FW-MA-SPEC-11.a:** Continue installing bat gates at the entrances of caves and abandoned mines or restricting public access by other means, or implementing exclusionary bat closure methods in order to protect known and potential bat hibernacula or maternity colonies that may be adversely affected by recreation, management, or other activities. *See also FW-GDL-SPEC-09 regarding emphasis on maintaining bat access where appropriate to do so.*

**FW-MA-SPEC-11.b:** To proactively prepare for and mitigate the potential spread of White-Nose Syndrome in GMUG bat populations, work with Colorado Parks and Wildlife and other partners to collect baseline bat population data and survey and/or model potential seasonal bat habitat, including winter hibernacula locations. Information can be used to inform future development of recovery targets.

## Big Game Species

### Desired Conditions

**FW-DC-SPEC-12:** Habitat blocks of sufficient size and quality exist across the landscape to support wildlife populations. Travel routes provide necessary access while maintaining relatively undisturbed high-quality habitat blocks—greater than 0.62 mile (1,000 m) from open motorized system routes and 0.41 mile (660 m) from open non-motorized system routes—sufficient in size to provide necessary security areas for populations of big game and other species. Relatively undisturbed migration and movement corridors exist across the landscape that provide sufficient security and habitat quality to allow for relatively unabated movement of big game and other species. *See also chapter 3, section Wildlife Management Areas – MA 3.2; the Forestwide desired conditions for ecosystem connectivity ECO-05 and for rangelands RNG-01; and the Forestwide objective for native species diversity SPEC-03. See also plan appendix 12 for supporting best available science.*

### Guidelines

**FW-GDL-SPEC-15:** To maintain desired distribution for big game, ecological conditions for big game species identified as a Species of Conservation Concern (SCC), and long-term population persistence for big game not identified as SCC, manage disturbance impacts to bighorn sheep, Rocky Mountain elk, mule deer, pronghorn antelope in production areas during their reproductive period (table 6), migration corridors when migratory movements occur, and severe and critical winter range and winter concentration areas during the winter (table 7). The areas described are delineated by Colorado Parks and Wildlife and are updated as data or conditions change; timing limitations could be applied to additional areas as identified in coordination with Colorado Parks and Wildlife. Permitted livestock grazing is not considered a displacing disturbance; impacts to wildlife habitat are managed through direction in the *Rangelands, Forage, and Grazing* sections, among others. *For*

*management of existing recreational use, see FW-GDL-REC-07 and GDL-REC-08 for adaptive management thresholds.*

**Table 6. Big game timing restrictions for production areas**

Species	Dates of Restriction
Pronghorn antelope	May 1 – July 1
Elk	May 15 – June 30
Mule deer	June 1 – July 31
Rocky Mountain bighorn sheep lambing areas	April 15 – June 30
Desert bighorn sheep	February 1 – May 1

**Table 7. Big game timing restrictions for severe winter range, critical winter range, winter concentration areas, and migration corridors**

Species	Dates of Restriction
Pronghorn antelope	December 1 – April 30
Elk	December 1 – April 30
Mule deer	December 1 – April 30
Rocky Mountain bighorn sheep (all winter range)	November 1 – April 30
Desert bighorn sheep (all winter range)	November 1 – April 30
Migration corridors	December 1 – April 30

**FW-GDL-SPEC-16:** To create large contiguous habitat blocks and big game security areas, travel route re-alignment options should be considered in association with pertinent project proposals. This guideline applies to big game production areas, migration corridors, severe and critical winter range, and winter concentration areas as mapped by Colorado Parks and Wildlife. Re-alignment may increase route density on the edge of mapped habitats provided that habitat connectivity is maintained, and overall density is reduced in interior habitats.

### ***At-Risk Species***

At-risk species include federally listed threatened, endangered, proposed, and candidate species, as well as species on the Regional Forester's list of Species of Conservation Concern within the plan area.

### ***At-Risk Species (General)***

#### **Desired Conditions**

**FW-DC-SPEC-17:** Forest Service actions provide ecological conditions that contribute to the recovery of threatened and endangered species, conserve proposed and candidate species, maintain viable populations of Species of Conservation Concern, and to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area.

## Standards

**FW-STND-SPEC-18:** Collection of Species of Conservation Concern shall be permitted for research, scientific, educational, cultural or conservation purposes only.

## Guidelines

**FW-GDL-SPEC-19:** To maintain viable populations of Species of Conservation Concern and contribute to recovery of federally listed species that are negatively affected by recreation and forest use, the Forest Service should manage human disturbance in pertinent habitats. Tools for managing use include restricting use (motorized or non-motorized, including foot or pack stock traffic) to designated routes where appropriate; implementing seasonal recreation closures; and/or stipulating reauthorizations and new authorizations of pertinent special use permits. *For big game species identified as Species of Conservation Concern, see also FW-GDL-SPEC-15 regarding specific seasonal timing restrictions.*

## Management Approaches

**FW-MA-SPEC-19.a:** Map populations and habitat of at-risk species to inform project planning.

**FW-MA-SPEC-19.b:** Work with Colorado Parks and Wildlife and the U.S. Fish and Wildlife Service to restore and maintain essential habitat for at-risk species and implement other recovery actions according to species recovery plans.

**FW-MA-SPEC-19.c:** While the priority for data compilation should focus on identified Species of Conservation Concern, coordinate with the Colorado Natural Heritage Program and Colorado Parks and Wildlife to track whether pertinent data has been updated for species considered for identification as Species of Conservation Concern, but which did not meet the criteria for identification as Species of Conservation Concern at the time of the final record of decision for the forest plan. *The species considered but not identified as Species of Conservation Concern, as well as which criteria were not met for each species, are listed in volume II of the environmental impact statement, appendix 3, tables 51 and 52.*

**FW-MA-SPEC-19.d:** Work with the Regional Office to re-evaluate the Regional Forester's Species of Conservation Concern list on a regular basis and per best available science. As needed, work with the Regional Office to administratively update the list. *See also companion management approach FW-MA-SPEC-19.c regarding coordination with state agencies for pertinent data updates.*

## Species of Conservation Concern

*The Species of Conservation Concern list may be administratively updated throughout the life of the forest plan. See forest plan webpage for current Regional Forester's list. Species-specific plan direction is identified below for the SCC identified at the time of the plan decision.*

### Bighorn Sheep – Rocky Mountain and Desert Bighorn subspecies

*See also direction above for general, non-at-risk big game species, including the guideline FW-GDL-SPEC-15 for seasonal timing restrictions specific to bighorn sheep (section Native Species Diversity, Terrestrial Species, Big Game Species.)*

## Standards

**FW-STND-SPEC-13:** On active grazing allotments, reduce the risk of interaction between domestic sheep or goats and bighorn sheep herds. Spatial and temporal separation reduces the potential for interaction and the associated probability of transmission of diseases between species. A risk assessment of potential risk of association or contact between domestic sheep or domestic goats and bighorn sheep shall inform associated allotment-level decisions and ongoing adaptive management of allotments. The level of risk assessment should be commensurate with the presumed degree of risk for inter-species association or contact and potential disease transmission. Estimates of bighorn sheep core herd range and movements across the landscape in relation to domestic sheep areas will be used to inform risk management. *See also supporting management approaches below.*

**FW-STND-SPEC-13.a:** Annual Operating Instructions for term grazing permits for sheep grazing in occupied bighorn sheep habitat shall outline requirements designed to facilitate prompt recovery of stray domestic sheep and potentially prompt removal of bighorn sheep by the appropriate entity. Annual Operating Instructions shall describe notification, coordination, and stray livestock procedures. In coordination with Colorado Parks and Wildlife, District Rangers, and range staff, determine appropriate measures on an allotment-level basis and per best available management practices. Such annual operating instructions should include, but are not limited to:

- Permittees shall report any observed domestic sheep or goat interaction with bighorn sheep to the GMUG and Colorado Parks and Wildlife as soon as possible, and should report no later than 24 hours from observation; at the time of any observation, the permittee shall recover any stray livestock.
- Permittees shall track the number of domestic sheep that are put onto an allotment at the beginning of a season and the number of domestic sheep that come off of the allotment at the end of the season, for the purposes of reporting any unexplained discrepancies to the GMUG. Such reports would facilitate any necessary corrective or removal action by the appropriate entity, in cooperation with Colorado Parks and Wildlife and the permittee. Recognizing that such allotments often overlap with lands managed by the Bureau of Land Management, coordinate recording and reporting accordingly.

## Guidelines

**FW-GDL-SPEC-13.b:** To reduce the risk of interaction between domestic sheep or goats and bighorn sheep herds, grazing allotments within bighorn sheep core herd home range should not be converted from cattle to sheep/goats, nor pertinent vacant or closed allotments re-opened, unless a risk assessment confirms that the risk of association between domestic bighorn sheep and domestic sheep/goats would be lower or maintained at the same level.

**FW-GDL-SPEC-14:** To reduce the risk of disease transmission between domestic goats and bighorn sheep, a risk assessment should inform how goats and sheep are used for vegetation management to ensure the potential for interaction is reduced. *See associated management approach for education of the public regarding recreational pack goat use.*

## Management Approaches

To support the implementation of FW-STND-SPEC-13, consider the following management approaches:

**FW-MA-SPEC-16.a:** Consider applying any of, but not limited to, the following tools to sheep allotments where there is a risk of association between domestic and bighorn sheep:

- Multiple herders

- Virtual fencing
- Geographic barriers
- Real-time communication about location of bighorn sheep herds
- Trucking instead of trailing
- Strategic salting and water locations
- Removal of sick animals
- Livestock protection dogs
- Drones for remote monitoring
- GPS collaring

**FW-MA-SPEC-16.b:** For grazing allotments that overlap bighorn sheep habitat, evaluate the need for National Environmental Policy Act sufficiency reviews as pertinent conditions and best available scientific information change.

**FW-MA-SPEC-16.c:** Coordinate with Colorado Parks and Wildlife and/or Western Association of Fish and Wildlife Agencies and livestock permittees to determine methods for assessing risk for association or contact between bighorn sheep and domestic sheep or domestic goats.

**FW-MA-SPEC-16.d:** Bighorn sheep herds with the greatest potential to contribute to population viability in the plan area should be prioritized. While CPW's statewide direction for management emphasis is on Tier 1 and Tier 2 populations (George et al. 2009), CPW also operates under the direction that the Tier categorization will not preclude management of smaller herds of local importance. Recognizing the meta-population status of bighorn sheep on the GMUG, coordinate with CPW on bighorn sheep management per CPW's Statewide Bighorn Management plan, which emphasizes larger herd complexes that represent groups of interconnected herds.

**FW-MA-SPEC-16.e:** Coordinate annually with Colorado Parks and Wildlife and domestic sheep permittees operating on allotments with the potential for association or contact with bighorn sheep. Continue coordination throughout the season and conduct postseason reviews as needed. Coordination could involve any of, but not limited to:

- Domestic sheep on/off dates, animal numbers, allotment pasture locations and grazing rotation and timing,
- Confirm bighorn sheep herd status, core herd home range extent, and foray information,
- Implementation of range allotment annual operating instructions, including any measures incorporated to address risk of physical interaction,
- Review list of contacts and update contact information if needed, which will facilitate implementing STND-SPEC-13.a if the need arises, and
- Lessons learned from previous season, including knowledge gained from any collared animals (domestic and wild sheep).

**FW-MA-SPEC-16.f:** Coordinate with recreational pack goat user groups to educate public about best practices within bighorn sheep habitat, including but not limited to the following: When recreation pack goats are being used in bighorn sheep habitat, any direct contact with bighorn sheep should be prevented while on the trail and in campsites by 1) keeping pack goats under control at all times by the owner and 2) discouraging bighorn sheep from approaching domestic goats.

## Black Swift

*See also plan direction FW-GDL-SPEC-19 regarding seasonal recreation restrictions to minimize impacts to at-risk species.*

**FW-MA-SPEC-19.e:** At sites where recreation has the potential to impact nesting black swifts, during the incubation and fledging period (June 15 – August 31), partner with Colorado Parks and Wildlife and others to educate recreationists regarding how to minimize their impacts. Discourage climbing on cliff walls and hiking within 100 meters of active nest sites. Consider installation of interpretive signage and seasonal staff presence at high-use sites. Consider seasonal closures if education and interpretation is insufficient to minimize disturbance. *See also plan guideline FW-GDL-SPEC-19.*

## Western Toad, Previously Named the “Boreal Toad”

### Guidelines

**FW-GDL-SPEC-20:** To protect winter hibernacula for western toad (previously named the “boreal toad”), within a 1.6-mile radius of documented boreal toad breeding sites<sup>2</sup>, operating ground-based equipment off of existing temporary or system roads during winter months (November – March) should only take place when there is at least 1 foot of packed snow or 4 inches of frozen soil. *See also the Forestwide standard and guideline for aquatic ecosystems AQTC-04 and the Forestwide guideline for the conservation watershed network, SPEC-23.*

**FW-GDL-SPEC-21:** To prevent incidental mortality and deleterious effects to rearing habitat, within a 0.5-mile radius of documented western toad (previously named the “boreal toad”) breeding sites, operating ground-based equipment off of existing temporary or system roads during non-winter months should avoid the following time periods for breeding and juvenile development: May 1 – September 30 for sites below 10,000 feet; May 15 – September 15 for sites at or higher than 10,000 feet.

**FW-GDL-SPEC-22** To protect known breeding habitat of western toad (previously named the “boreal toad”), no new instream or wetland disturbances, structures, or impoundments should be authorized within 0.25 mile of known breeding sites. **Exception:** unless the project improves ecological function in aquatic ecosystems (e.g., beaver dam analogs where appropriate, fish barriers or other infrastructure constructed to promote native cutthroat trout conservation).

**FW-GDL-SPEC-22.a:** To maintain or improve western toad (previously named the “boreal toad”) breeding habitat, livestock managers should implement adaptive management strategies to avoid livestock congregation within a minimum of 100 feet from streambanks and wetlands that are within 1/3 mile of breeding sites throughout the breeding season. Breeding season is dependent on snowmelt and typically occurs from May through July. *See plan appendix 12 for supporting science.*

**FW-GDL-SPEC-23:** To protect habitat for western toad (previously named the “boreal toad”) where there is no known occurrence of *Batrachochytrium dendrobatidis*—the causative pathogen for the chytrid fungus, ground-based equipment should undergo the most current decontamination protocols defined by Colorado Parks and Wildlife or equivalent prior to operating in the subwatershed. At the

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<sup>2</sup> There are currently seven documented breeding sites in the GMUG. Three of those are in designated wilderness, two are partially in Colorado roadless areas.

time of the forest plan decision, known chytrid-free sites are in the Upper East River subwatershed [140200010201]. *See also FW-STND-IVSP-03 and GDL-IVSP-08.*

## Gunnison's Prairie Dog

### Standards

**FW-STND-SPEC-24:** To maintain population viability, new surface-disturbing activities shall not be authorized on Gunnison's prairie dog colonies. A *viable population* is defined and further explained at FSH 1909.12.12.23c.

### Guidelines

**FW-GDL-SPEC-25:** To prevent disturbances that impact population recruitment, avoid disturbance of active Gunnison's prairie dog colonies from March 1 to June 15, or dates determined in consultation with Colorado Parks and Wildlife.

## At-Risk Plants

At-risk plant species include federally listed threatened, endangered, proposed, and candidate species, as well as species on the regional forester's list of Species of Conservation Concern within the plan area.

### Objectives

**FW-OBJ-SPEC-28:** Within 3 years of plan approval, identify locations where illegal off-route motorized travel is a risk factor for at-risk plant occurrences. Within 10 years of plan approval, develop actions to minimize this risk at all known locations; exception: *Sclerocactus dawsonii* (Colorado Hookless Cactus) and *Phacelia submutica* (DeBeque phacelia) are addressed in FW-OBJ-SPEC-03 with an accelerated timeline). Such actions include construction of adequate turn-around and pull-off areas, as well as fencing and/or physical barriers where necessary. If used, physical barriers should be compatible with the design, development, and/or management level of trail.

**FW-OBJ-SPEC-29:** Within 3 years of plan approval, install cameras near occurrences of *Sclerocactus dawsonii* (Colorado Hookless Cactus) and *Phacelia submutica* (DeBeque phacelia) to increase understanding of potential big game, recreation, and livestock impacts. If evidence indicates that negative impacts from wildlife, recreation, or livestock are occurring, work with Colorado Parks and Wildlife (as applicable) and relevant GMUG staff areas to mitigate these impacts.

**FW-OBJ-SPEC-30:** Within 3 years of plan approval, implement actions to minimize the potential for off-route motorized travel within 600 feet of known occurrences of *Sclerocactus dawsonii* (Colorado Hookless Cactus) and *Phacelia submutica* (DeBeque phacelia). Such actions may include construction of adequate turn-around and pull-off areas, as well as fencing and/or physical barriers where necessary. If used, physical barriers should be compatible with the design, development, and/or management level of trail.

**FW-OBJ-SPEC-30.a:** Within 5 years of plan approval, identify locations where invasive plants and noxious weeds are a risk factor for known at-risk plant occurrences. Within 10 years of plan approval, implement actions to minimize this risk at all known locations. Such actions include establishing priority treatment areas, training relevant staff on the identification of invasives, noxious weeds, and at-risk plant species, establishing methods to reduce non-target effects from herbicide application.

*See also Forestwide objective IVSP-02.*

## Guidelines

**FW-GDL-SPEC-31:** To provide ecological conditions that contribute to the recovery of threatened and endangered plant species, conserve proposed and candidate plant species, and maintain viable populations of plant Species of Conservation Concern, new and reauthorized surface-disturbing activities (*see glossary*) should not occur within 600 feet of known locations of such plant species, within designated critical habitat for DeBeque phacelia (*Phacelia submutica*), or within pygmy shrew habitat. For at-risk plant locations and/or specified habitat already located within 600 feet of surface-disturbing activities, map locations of at-risk plants to share with road crews and other applicable parties prior to maintenance work; use water only for dust abatement; do not seed, spray, or mow unless conducted as a restoration action specific to the at-risk species; avoid covering plants if grading road; and consider plant location during snow and ice control measures (Panjabi and Smith 2014).

*See also Forestwide guideline IVSP-07.*

## Management Approaches

**FW-MA-SPEC-31.a:** To support implementation of FW-GDL-SPEC-31, in initial plan-to-project meetings, focus on the known locations of at-risk plant species within the proposed project area and examine if the proposed actions meet the glossary description of surface-disturbing activity.

**FW-MA-SPEC-31.b** When determining *viable populations* in the context of the forest plan, including guideline SPEC-31, use the definitions and explanations of the constituent terms of a viable population at FSH 1909.12.12.23c and the descriptions of ecological conditions for the regional forester's Species of Conservation Concern (*See volume II of the final environmental impact statement, appendix 3, table 60. Also see plan glossary*).

## Federally Listed Species

### Canada Lynx (Federally Threatened)

#### Desired Conditions

**FW-DC-SPEC-32:** Connected forested habitats allow lynx and other large and medium size carnivores to move long distances in search of food, cover, and mates (Ruediger et al. 2000, Interagency Lynx Biology Team 2013) within and between lynx analysis units. Habitat connectivity allows lynx movement within identified linkage areas between mountain ranges, adjacent forests, and across highways.

**FW-DC-SPEC-33:** Canada lynx populations and habitat in the national forests contribute toward range-wide species conservation and recovery, consistent with the best available scientific information (Lynx Conservation Assessment and Strategy or most recent conservation plan). Each lynx analysis unit contains a diversity of structural stages, stand initiation, stem exclusion, and understory reinitiation subalpine coniferous forest and mixed aspen-conifer stands. Regenerating conifer stands provides habitat for snowshoe hares. Spruce-fir stands impacted by spruce-bark beetles are regenerating. Lynx analysis units contain structural habitat diversity (uneven age classes) to support prey species.



## Objectives

**FW-OBJ-SPEC-33.a:** Within 5 years of plan approval, identify and evaluate threats and habitat conditions within Canada lynx linkage areas with partners (to include but not limited to: U.S. Fish and Wildlife Service, Colorado Parks and Wildlife, Colorado Department of Transportation, Bureau of Land Management) to gain an understanding of how to provide desired habitat connectivity. *See also management approaches for Canada lynx.*

## Standards

**FW-STND-SPEC-34:** The Southern Rockies Lynx Amendment direction (plan appendix 4), as supplemented by the GMUG revised forest plan, shall be applied.

**FW-STND-SPEC-35 (SRLA VEG S8):** Salvage harvest, sanitation, or hazardous fuels treatments in high-quality lynx habitat that does not qualify for the Southern Rockies Lynx Amendment VEG S6 criteria due to overstory mortality is limited to 1 percent of mapped lynx habitat. This applies to all mapped lynx habitat on the GMUG and is not calculated at a Lynx Analysis Unit scale. Other treatment types are not subject to VEG S8 but must adhere to all other applicable Southern Rockies Lynx Amendment direction.

**Exceptions, for which the VEG S8 cap would not apply:** 1) Vegetation management designed with the primary objective to maintain or restore lynx habitat, 2) the removal of hazard trees immediately proximal to system roads and other infrastructure, defined as two-tree lengths' distance, and 3) sanitation treatment of blowdown to prevent or minimize epidemic levels of insect infestations. 4) *For fuel treatment projects within the wildland-urban interface, see the existing Southern Rockies Lynx Amendment guideline VEG G10 and definition of wildland-urban interface as applied in the Southern Rockies Lynx Amendment (plan appendix 4).*

*See also FW-GDL-ECO-07, table 5 regarding requirements for snag density and size requirements.*

VEG S8 high-quality habitat criteria include:

- 1) Overstories predominantly of dead Engelmann spruce and subalpine fir, or either species, with a sub-canopy layer dominated by subalpine fir, or a combination of either Engelmann spruce or aspen, or both (*see plan appendix 12, Footnotes Regarding Best Available Scientific Information.*)
- 2) Total live overstory canopy cover less than or equal to 40 percent\*, and
- 3) Understory horizontal cover<sup>19</sup> density from ground level to 3 meters above ground level is greater than or equal to 45 percent during winter foraging conditions for snowshoe hares.

*\*When total live overstory canopy exceeds 40 percent, but criteria 1 and 3 are still met, refer instead to existing Southern Rockies Lynx Amendment VEG S6 direction, plan appendix 4.*

All vegetation management activities in VEG S8 stands shall be tracked for the life of the forest plan decision, as calculated across all mapped lynx habitat in the GMUG; it is not calculated at a Lynx Analysis Unit scale. Reporting for tracked activities must quantify acres for which a reduction in horizontal cover occurs and quantify acres converted to a Stand Initiation Structural Stage. *See also Management Approaches below regarding how to prioritize harvest in lynx habitat and integrate lynx habitat objectives in vegetation management prescriptions. See the glossary of plan appendix 4, Southern Rockies Lynx Amendment for definition of wildland-urban interface and for more supporting science and background on this standard, as well as plan appendix 12, Footnotes Regarding Best Available Scientific Information.*

## Management Approaches

**FW-MA-SPEC-35.a:** Work with partners to evaluate and update current lynx linkage areas to provide the desired habitat connectivity functions, as practical and needed based on available resources.

**FW-MA-SPEC-35.b:** For vegetation management in lynx habitat, prioritize selection of treatment areas in the following order:

- 1) Select areas with good habitat restoration potential that currently exhibit poor quality lynx habitat condition (e.g., horizontal cover density less than 25 percent, subalpine fir is a minor component of the sub-canopy, favorable site conditions, and best available scientific information suggests that conditions could be improved through vegetation management), then
- 2) Select areas that provide poor quality lynx habitat and poor habitat restoration potential, and then
- 3) Select all other areas on the basis of overall project considerations and needs.

**FW-MA-SPEC-35.c:** In addition to adherence to all requirements of the 2008 SRLA (plan Appendix 4), as supplemented by this revised plan (FW-STND-SPEC-34), consider the following lynx habitat components when developing vegetation management prescriptions in all lynx habitat:

- Horizontal cover: Areas with greater than 45 percent are considered the highest quality snowshoe hare and lynx habitat.
- Understory conifers: Preserve understory, particularly subalpine fir and Engelmann spruce, in the sub-canopy.
- Size and basal area of dead trees: Sub-canopy development is reduced by salvage; thus, snag retention is most important in areas with high amounts of live understory.
- Shade retention: Dead trees and remaining live trees should be retained strategically to provide shade protection for developing understory trees.
- Retain and protect live subalpine fir from incidental damage.
- Plant subalpine fir post-harvest.
- Canopy cover.
- Harvest in a mosaic framework: Consider location of harvest on the landscape in relation to lynx high-use areas.

## Gray Wolf (Federally Threatened, 10(J) Experimental Population in Colorado)

*At the time of the forest plan decision, there is no documentation of the Gray wolf on the GMUG. If and when the species is documented on the GMUG, the following direction would be applied.*

## Management Approach

**FW-MA-SPEC-35d:** Collaborate with Colorado Parks and Wildlife and other pertinent partners to implement Colorado Parks and Wildlife's Wolf Restoration and Management Plan.

## Gunnison Sage-Grouse (Federally Threatened)

### Desired Conditions

**FW-DC-SPEC-36:** Sagebrush ecosystems support the habitat needs of Gunnison sage-grouse and other sagebrush obligate species with a diversity of native grasses and forbs, appropriate habitat structure such as tall mature sagebrush to provide nesting and winter habitat, and lack of soil disturbance that allow them to resist invasion by and conversion to cheatgrass. Residual forb and grass production and ground cover, together with current year growth, provide vegetation suitable for nesting cover. Natural wet meadows and riparian habitats within the sagebrush landscape are resilient despite a changing climate. *(See structural habitat guidelines, Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005, pp. 212-213, appendix H, and grazing objective 1-1, p. 211); the Primary Constituent Elements described in the final rule of the critical habitat designation; and Bureau of Land Management Instruction Memorandum No. CO-2022-028, Attachment 2: Seasonal Habitat Objectives for Gunnison Sage-Grouse).* The GMUG manages National Forest System lands with Gunnison sage-grouse habitat to meet or exceed the structural habitat guidelines when ecological site potential exists and works with the U.S. Fish and Wildlife Service, Bureau of Land Management, and Colorado Parks and Wildlife to identify the best available science on conservation measures that help maintain or move toward desired habitat conditions. *See also FW-GDL-SPEC-52.a, supporting management approaches, and the Forestwide objective for invasive species IVSP-02. See appendix 12 for supporting science and further detail regarding Primary Constituent Elements of sage-grouse habitat.*

**FW-DC-SPEC-37:** Self-sustaining populations of Gunnison sage-grouse thrive on areas of suitable habitat, while potentially suitable unoccupied or historic habitat is in a condition that could support population expansion. Known lek sites continue to be used during breeding seasons, and new or historic lek sites become active as the sage-grouse population increases.

**FW-DC-SPEC-37.a:** Healthy, sustainable aspen stands within and along the fringes of sagebrush-steppe and within designated Gunnison sage-grouse critical habitat provide mesic food resources (insects and forbs) for Gunnison sage-grouse. Landscape-scale aspen treatments provide adequate regeneration and survival of aspen sprouts that withstand ungulate browsing pressure.

### Objectives

**FW-OBJ-SPEC-37.b:** Biennially, complete a report on GMUG National Forests Recovery Implementation Strategy progress and habitat monitoring results. Report accomplishments in the [Conservation Efforts Database](#). For transparency, share this report with partners including but not limited to U.S. Fish and Wildlife Service and Colorado Parks and Wildlife. All completed grazing allotment NEPA sufficiency reviews within GUSG allotments should be included in the annual reporting to the Service. *See FW-OBJ-SPEC-37.c.*

**FW-OBJ-SPEC-37.c:** Within 3 to 5 years of plan approval, grazing sufficiency reviews should be conducted on all GUSG allotments with current NEPA decisions – in both occupied and unoccupied designated critical habitat – and should include best available science and technical assistance with the Service to determine 1) how authorized grazing does or does not impact GUSG habitat Primary Constituent Elements, 2) if adverse effects are resulting from the currently authorized grazing actions, and 3) if current NEPA provides coverage for grazing authorizations, including whether updated section 7 consultation of the allotment is warranted. Information to determine NEPA adequacy should include previous and current Annual Operating Instruction information, GUSG population metrics, and any existing: monitoring data, Habitat Assessment Framework data, Rangeland Analysis Platform data, Ecological Site Description potential, and any other data useful to

determine allotment health. Completion of allotment sufficiency reviews should first prioritize occupied and areas with high habitat suitability in GUSG designated critical habitat.<sup>3</sup>

**FW-OBJ-SPEC-38:** Within 5 years of plan approval, identify redundant system routes to consider for permanent or seasonal closure, and rehabilitate illegal routes (non-system, user-created) in suitable Gunnison sage-grouse habitat within 4 miles of mapped Gunnison sage-grouse leks.

**FW-OBJ-SPEC-39:** Within 5 years of plan approval, install educational signs at priority kiosks, terra trailheads, or road access points that serve as portals to occupied Gunnison sage-grouse habitat to 1) request the public to leash pets when recreating, and 2) to inform users about common noxious weeds and how to identify and report observations to enhance early detection and treatment response. Coordinate prioritization with partners.

**FW-OBJ-SPEC-40:** Within 5 years of plan approval, identify, assess, and address sections of fence lines or other infrastructure in Gunnison sage-grouse habitat with a high potential for sage-grouse collision and mortality based on best available scientific information. Evaluate options for removal (if no longer needed), relocation (if feasible), or marking to increase visibility.

## Standards

**FW-STND-SPEC-41:** The GMUG National Forests shall contribute to Gunnison sage-grouse recovery by following the Recovery Plan and implementing actions in alignment with the Recovery Implementation Strategy. Coordinate with partners to implement priority actions per the Recovery Implementation Strategy.

**FW-STND-SPEC-42:** Surface-disturbing activities in designated critical Gunnison sage-grouse habitat shall incorporate reclamation measures or design features that accelerate recovery and native vegetation re-establishment of affected sage-grouse habitat, consistent with the best available scientific information. *See supporting management approach FW-MA-SPEC-52.j.*

**FW-STND-SPEC-43:** To maintain, improve, or enhance occupied Gunnison sage-grouse habitat, avoid surface-disturbing activities within 1 mile of active and inactive leks unless they would maintain or enhance Gunnison sage-grouse habitat (e.g., low-technology habitat restoration techniques that maintain or restore wet meadow and riparian habitat).

## Guidelines

*Multiple seasonal timing restrictions are contained in the following guidelines; they are briefly summarized in table 8, but see each full guideline for entirety of direction.*

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<sup>3</sup> In the interim, while sufficiency reviews are ongoing during this 3 – 5-year period, consistent with the USFWS concurrence letter (May 2024) to the revised forest plan, the GMUG will implement voluntary adaptive management strategies and incorporate conservation measures in Annual Operating Instructions for grazing allotments consistent with the U.S. Fish and Wildlife Service Recovery Implementation Strategy Priority Activity 6.01; the GMUG will voluntarily implement these measures in coordination with grazing permittees and range and wildlife staff.

**Table 8. Seasonal timing restrictions for Gunnison sage-grouse habitat**

Plan component	Dates, Biological Period, and Area of Restriction	Applicable Activities and Exceptions
<b>FW-GDL-SPEC-50</b>	<ul style="list-style-type: none"> <li>December 1 to July 15</li> <li>Winter and breeding season</li> <li>Flat Top Mountain and Flat Top/Red Mountain Wildlife Management Areas in the Gunnison Ranger District</li> </ul>	<p>Closed to all forms of public uses.</p> <p><b>Exceptions:</b> permittees, access to private property, emergency maintenance, law enforcement, and agency administrative use. Travel associated with excepted uses should occur after 9 a.m.</p>
<b>FW-GDL-SPEC-52</b>	<ul style="list-style-type: none"> <li>December 1 to July 15</li> <li>Occupied Gunnison sage-grouse habitat</li> <li>Winter and breeding season</li> </ul>	<p>Recreation events, outfitting, and guiding permits should not be authorized or reauthorized.</p> <p><b>Exception:</b> See FW-GDL-SPEC-50 for Flat Top Mountain and Flat Top/Red Mountain WMAs.</p>
<b>FW-GDL-SPEC-51</b>	<ul style="list-style-type: none"> <li>(Condition-based) December 1 to March 31</li> <li>Winter season</li> <li>Identified grouse winter concentration areas</li> </ul>	<p>During severe winters, area travel closures should be implemented to protect identified or modeled grouse concentration areas. The following criteria should be considered to determine if winter conditions warrant an area closure:</p> <ul style="list-style-type: none"> <li>Above average snow depth</li> <li>Below average temperature</li> <li>Snow condition and consistency</li> <li>Prior year's forage availability and habitat condition.</li> </ul> <p><b>Exception:</b> See FW-GDL-SPEC-50 for Flat Top Mountain and Flat Top/Red Mountain WMAs.</p> <p><b>Exceptions:</b> permittees, access to private property, emergency maintenance, law enforcement, and agency administrative use. Travel associated with excepted uses should occur after 9 a.m.</p>
<b>FW-GDL-SPEC-48</b>	<ul style="list-style-type: none"> <li>March 1 through July 15</li> <li>Breeding season (lekking, nesting, and peak brood-rearing)</li> <li>Occupied Gunnison sage-grouse habitat</li> </ul>	<p>Construction, maintenance, and access, including public access.</p> <p>Roads should be closed to motorized and mechanized travel during this time period.</p> <p><b>Exception:</b> See FW-GDL-SPEC-50 for Flat Top Mountain and Flat Top/Red Mountain WMAs.</p> <p><b>Exceptions:</b> permittees, access to private property, emergency maintenance, law enforcement, and agency administrative use. Travel associated with excepted uses should occur after 9 a.m.</p>
<b>FW-GDL-SPEC-49</b>	<ul style="list-style-type: none"> <li>March 1 to July 15</li> <li>Breeding and early brood-rearing season (lekking, nesting, and peak brood-rearing)</li> <li>Within 1.0 mile of leks</li> </ul>	<p>Noise resulting from authorized management activities, when combined with ambient background noise levels, does not result in exceeding a total of 27 decibels.</p>

**FW-GDL-SPEC-44:** To minimize permanent habitat loss, new special use authorizations that entail new infrastructure development should be avoided in occupied Gunnison sage-grouse habitat. Exceptions: the right-of-way is the only reasonable access to exercise a valid existing right, e.g., private property, water, a mineral right. If an exception is met, apply FW-GDL-SPEC-45.

**FW-GDL-SPEC-45:** To minimize loss of habitat connectivity within designated critical Gunnison sage-grouse habitat, for new utility lines, communication sites, or other comparable infrastructure that requires temporary or permanent access routes, siting options should be evaluated in conjunction with proposed access routes to determine the location that would cause the least amount of habitat fragmentation. Access routes should use existing impacted areas. *See first FW-GDL-SPEC-44 for restrictions on special use authorizations for new infrastructure development.*

**FW-GDL-SPEC-46:** To reduce the potential for avian predation of Gunnison sage-grouse, the forest should require new authorizations and reauthorizations for infrastructure to include the most effective perch deterrent methods available on all powerline poles and other vertical infrastructure that are within nesting habitat or within line-of-site of lek sites. Where practical, bury powerlines on new authorizations unless doing so has a significant risk of weed invasion.

**FW-GDL-SPEC-47:** To avoid or minimize habitat degradation within designated critical Gunnison sage-grouse habitat, the integrated weed prevention practices described in appendix A of the Gunnison Basin Candidate Conservation Agreement (2013), or as determined using best available science, should be integrated into all projects with potential to introduce or spread invasive plant species. *See also the Forestwide standards for invasive species IVSP-03 and -04 for additional pertinent direction.*

**FW-GDL-SPEC-48:** To minimize disturbance during the breeding season (lek, nesting, and peak brood-rearing) in occupied Gunnison sage-grouse habitat, seasonal timing restrictions on construction, maintenance, and access, including public access, should be applied from March 1 through July 15 or as otherwise identified in best available science. Roads should be closed to motorized and mechanized travel during this time period, with the following exceptions: permittees, access to private property, emergency maintenance, law enforcement, and other agency administrative use. Travel associated with excepted uses should occur after 9 a.m. *For closure dates for the Flat Top Mountain and Flat Top/Red Mountain Wildlife Management Areas, see instead GDL-SPEC-50.*

**FW-GDL-SPEC-49:** To avoid disturbance to Gunnison sage-grouse during the breeding and early brood-rearing season, restrictions should be applied to authorized management activities from March 1 to July 15 such that associated noise, combined with ambient background noise levels, does not result in exceeding a total of 27 decibels within 1.0 mile of leks, or as determined and updated per best available scientific information and site-level analysis. Exceptions: Access for permittees, access to private property, emergency maintenance, law enforcement, and other agency administrative use.

**FW-GDL-SPEC-50:** To contribute to species recovery, during critical biological periods for Gunnison sage-grouse, the Flat Top and Flat Top/Red Mountain Wildlife Management Areas in the Gunnison Ranger District should be seasonally closed from December 1 to July 15 to all forms of public uses, with the following exceptions: permittees, access to private property, emergency maintenance, law enforcement, and other agency administrative use. Travel associated with excepted uses should occur after 9 a.m. *See also the wildlife management area standard WLDF-02.a.*

**FW-GDL-SPEC-51:** To minimize impact to Gunnison sage-grouse during severe winters, area travel closures should be implemented to protect identified or modeled grouse concentration areas. Closure decisions will be made in the context of managing for multiple resources, including big-game concentrations, recreation, and range condition, and could occur anytime from December 1 to March 31. **Exceptions:** permittees, access to private property, emergency maintenance, law

enforcement, and other agency administrative use. Travel associated with excepted uses should occur after 9 a.m. *For closure dates for the Flat Top Mountain and Flat Top/Red Mountain Wildlife Management Areas, see instead GDL-SPEC-50.*

The following criteria should be considered to determine if winter conditions warrant an area closure:

- Above average snow depth,
- Below average temperature,
- Snow condition and consistency, and
- Prior year's forage availability and habitat condition.

**FW-GDL-SPEC-52:** To avoid disturbance to Gunnison sage-grouse during the winter and breeding periods, approximately December 1 to July 15, new authorizations and reauthorizations for recreation events, outfitting, and guiding permits should not be issued during this timeframe within occupied habitat. *For closure dates for the Flat Top Mountain and Flat Top/Red Mountain Wildlife Management Areas, see instead GDL-SPEC-50.*

**FW-GDL-SPEC-52.a:** To maintain or improve Gunnison sage-grouse habitat, livestock should be managed to meet or exceed the structural habitat guidelines outlined in the U.S. Fish and Wildlife Service Primary Constituent Elements and other best available science, when ecological site potential exists. *See associated management approach below (FW-MA-SPEC-52.g). See also plan appendix 12 regarding Primary Constituent Elements and other best available science.*

**FW-GDL-SPEC-52.b:** To maintain seasonal habitats and designated critical habitat Primary Constituent Elements for breeding and winter habitat, sagebrush removal or manipulation in nesting and wintering habitats should be avoided, unless vegetation management activities would enhance habitat conditions. **Exception:** minor removal associated with incidental use. *See glossary for definition of surface-disturbing activities and incidental use. See also plan appendix 12 regarding Primary Constituent Elements and other best available science.*

**FW-GDL-SPEC-52.c:** To work toward desired conditions for Gunnison sage-grouse habitat and contribute to species recovery, habitat treatments and vegetation management prescriptions in Gunnison sage-grouse habitat should incorporate appropriate effectiveness monitoring to determine whether one or more of the following goals are being achieved:

1. Meeting site-specific habitat objectives consistent with the designated critical habitat Primary Constituent Elements and best available science (see plan appendix 12).
2. Enhancing the long-term sustainability of local Gunnison sage-grouse populations.
3. Promoting the maintenance of large intact sagebrush communities.
4. Limiting the expansion and dominance of invasive species.
5. Maintaining or improving soil site stability, hydrologic function, and biological integrity.
6. Enhancing the native plant community, including the native shrub reference state in the State and Transition Model, with appropriate shrub, grass, and forb composition identified in the applicable Ecological Site Description where available.
7. Meeting specific project or management objectives as they relate to Gunnison sage-grouse or their habitat.

**FW-GDL-SPEC-52.d:** To work toward desired conditions for Gunnison sage-grouse habitat and contribute to species recovery, monitoring plans for livestock grazing should be developed for every allotment or portion of allotment with Gunnison sage-grouse habitat. Monitoring plans should

incorporate Gunnison sage-grouse habitat objectives and consider ecological site potential, livestock use patterns, and other factors to assess whether the grazing management system is achieving the desired objectives. Monitoring may include cooperative monitoring involving permittees, long-term trend monitoring, short-term trend monitoring, utilization (utilization cages), photo points, and any other appropriate rangeland trend monitoring methods.

**FW-GDL-SPEC-52.e:** To work toward desired conditions for Gunnison sage-grouse habitat and contribute to species recovery, within Gunnison sage-grouse habitat, if livestock management practices are determined via monitoring data to be a causal factor in not meeting or making progress toward achieving habitat objectives and causal factors are unrelated to ecological site potential, grazing management should be modified to include, but not limited to:

- Provide periods of rest or deferment during critical growth periods of key vegetation species, and
- Limit grazing duration and intensity to allow plant growth sufficient to meet habitat objectives (*see plan appendix 12 for supporting science for Critical Habitat Primary Constituent Elements*). Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season March 1 to June 30 (lekking period is approximately March 1 to May 15 and nesting period is approximately April 1 to June 30).

#### Management Approaches

**FW-MA-SPEC-52.f:** Participate with the NRCS and BLM to complete Ecological Site Descriptions in Gunnison sage-grouse habitat.

**FW-MA-SPEC-52.g:** To support implementation of plan guideline SPEC-52.a, use Natural Resource Conservation Service Ecological Site Descriptions and associated soil mapping, and the Ecological Types of the Upper Gunnison Basin (Johnston et al. 2001) as tools in evaluating site potential. If Ecological Site Descriptions and associated soil mapping do not provide a suitable benchmark reference, identify and document local reference sites for areas of similar potential. Ecological site potential and habitat suitability should be coupled when developing livestock management strategies in Gunnison sage-grouse habitat. This approach allows managers to assess the health, productivity, and plant species diversity of the ecological site and incorporate them into management strategies within areas that can provide suitable habitat for the Gunnison sage-grouse. For areas that do not have the ecological site potential to meet the structural habitat guidelines outlined in the U.S. Fish and Wildlife Service Primary Constituent Elements and other best available science (*see plan appendix 12*), manage for the potential within the Ecological Site Description or Ecological Site Group, accounting for the state and transition models, striving to manage for or move toward the potential that best contributes to Gunnison sage-grouse biological needs. Consider the following approaches when managing permitted livestock numbers, seasonal use, rotation, and duration to maintain Gunnison sage-grouse seasonal habitat objectives where ecological site potential exists:

- Incorporate Gunnison sage-grouse habitat objectives and management considerations into annual operating instructions for allotments within Gunnison sage-grouse habitat.
- Allow for growth and re-growth in each pasture during the growing season to provide quality vegetation.
- Maintain residual herbaceous cover to reduce predation during Gunnison sage-grouse nesting and early brood-rearing.
- During drought years or following a fire event, perform range readiness reviews of impacted allotments prior to livestock turnout to determine if it is necessary to adjust both number and/or



timing of livestock appropriate to meet structural habitat guidelines in the range allotment's annual operating instructions.

**FW-MA-SPEC-52.h:** For vegetation treatments, fuels management and habitat restoration in Gunnison sage-grouse designated critical habitat, incorporate habitat objectives:

- 1) based on the potential natural community within the applicable Ecological Site Description (*See designated critical habitat Primary Constituent Elements as described in the designated critical habitat Final Rule (79 FR 69311-69363) or applicable best available science in plan appendix 12*), and
- 2) incorporate habitat objectives associated with increasing Gunnison sage-grouse populations based on best available scientific information.

*See also the Gunnison sage-grouse standards FW-STND-SPEC-37.a, SPEC-41, and SPEC-52.b.*

**FW-MA-SPEC-52.i:** When planning projects to remove pinyon trees for fuels treatments or to benefit Gunnison sage-grouse, consider best available guidance to minimize impacts to pinyon jay and other pinyon-juniper-dependent species. Vegetation and fuels management of pinyon-juniper should generally maintain old forest characteristics that support at-risk or pinyon-juniper-dependent species (e.g., pinyon jay). *See also plan appendix 12 for supporting science.*

**FW-MA-SPEC-52.j:** Where sagebrush is prevalent or where cheatgrass is a concern, incorporate invasive plant treatments prior to vegetation or fuels management treatments. Consider methods that are relatively less prone to spreading cheatgrass and/or other invasive plants, such as mechanical treatments rather than prescribed fire, unless invasive plant treatments are shown to effectively reduce invasive species risk before vegetation treatments are implemented.

**FW-MA-SPEC-52.k:** To contribute to Gunnison sage-grouse recovery, evaluate non-federal land parcels where enhanced conservation would benefit Gunnison sage-grouse in partnership with private landowners, local, State, and Federal Government entities and relevant non-government organizations such as land trusts. Prioritize parcels in suitable or potentially suitable habitat for cross-boundary partnership opportunities. *See also Lands section for management approach for prioritization of land acquisitions, including for designated critical habitat.*

**FW-MA-SPEC-52.l:** As part of a future Gunnison sage-grouse monitoring strategy, for greater consistency with GUSG habitat monitoring on neighboring BLM lands, consider adopting BLM's Habitat Assessment Framework approach and Assessment, Inventory and Monitoring (AIM) approach. This type of monitoring strategy could provide opportunities for the Forest Service and BLM to partner on cross-boundary habitat monitoring, increasing capacity and efficiencies for both agencies.

**FW-MA-SPEC-52.m:** In cooperation with partners, facilitate and contribute to restoration activities for streams and wet meadows that provide essential brood-rearing habitat for GUSG (Neely et al. 2011), per Nature Conservancy recommendations for Gunnison Basin land managers. Of the 37 high priority stream reaches identified by the study, the GMUG has land ownership along 21, particularly in their headwaters. Those streams include Wood Gulch N., Sheep Gulch, Alkali Creek, Sewell Gulch, Alder Creek, West Pass Creek, Barret Creek N., Outlet Los Pinos Creek, Outlet S. Beaver Creek, Middle Ohio Creek, Stubbs Gulch, Beaver Creek, Willow-Quartz Creek, Outlet Taylor River, Outlet Cochetopa Creek, Rock Creek, Archuleta Creek, Cabin Creek, Lower East River, Pine Creek Mesa N., Red Creek, and Steuben Gulch.

## Silverspot Butterfly (Federally Threatened) and Uncompahgre Fritillary Butterfly (Federally Endangered)

### Standards

**FW-STND-SPEC-26:** To avoid take and to maintain population viability, collection of Uncompahgre fritillary and silverspot butterflies is not allowed, except for scientific or conservation purposes authorized only after a permit is obtained from the U.S. Fish and Wildlife Service. Capturing, killing, possessing, or transporting Uncompahgre fritillary or silverspot butterflies in any part of their life cycle is prohibited.

**FW-STND-SPEC-27:** To assist in species recovery and to avoid species and habitat impacts, new or realigned recreation trails or other habitat-disturbing activities must avoid Uncompahgre fritillary butterfly snow willow habitat and Silverspot butterfly bog violet habitat. **Exception:** management actions supported by the U.S. Fish and Wildlife Service as beneficial to habitat. *See SPEC-27.a for livestock-related direction.*

**FW-STND-SPEC-27.a:** Authorized livestock trailing through occupied Uncompahgre fritillary butterfly habitat shall be completed in a single day, with no overnight use, bedding, or grazing. Conduct sufficiency reviews of any allotments known to contain Uncompahgre fritillary butterfly colonies or suitable habitat to determine if reasonable alternatives to trailing through the habitat exist and employ them in the next Annual Operating Instructions.

### Wolverine

*At the time of the forest plan decision, there is no documentation of wolverines in the GMUG. If the species is reintroduced by the pertinent authorities, the following direction would be applied.*

### Desired Condition

**FW-DC-SPEC-58:** Subalpine forest and alpine habitats characterized by persistent snow cover and cooler temperatures provide high-quality reproductive habitat, denning and foraging opportunities for wolverines. High-elevation habitat and associated microclimates provide refugia and habitat connectivity for wolverines in the face of changing climates and emerging threats. *See also FW-DC-ECO-03 and FW-OBJ-ECO-04.*

### Guideline

**FW-GDL-SPEC-59:** To provide secure reproductive habitat for wolverine, in maternal habitat for wolverines, authorized activities should be stipulated to manage associated impacts consistent with future Recovery Plans or other interagency agreements.

### Management Approach

**FW-MA-SPEC-60:** Consider maternal habitat for wolverines during winter travel management planning. Minimize designation of system winter routes and open areas in maternal habitat (Copeland et al. 2010; Inman 2013).

## Paleontology (PLEO)

### ***Desired Conditions***

**FW-DC-PLEO-01:** Paleontological resources are managed for a range of sustainable multiple uses, including but not limited to education, research, recreational, and cultural uses. Paleontological resources are managed using scientific principles and expertise to provide geological time markers, insights into past depositional environments and climate history, and opportunities for tourism.

### ***Guidelines***

**FW-GDL-PLEO-02:** To preserve paleontological resources of scientific, educational, interpretive, and/or recreational value, project implementation should mitigate or avoid disturbance to these resources (FSM 1920.12). Where geologic units are likely to contain paleontological resources, a paleontological resource assessment should be completed by a qualified paleontologist prior to surface-disturbing activity.

## Soil Resources (SOIL)

### ***Desired Conditions***

**FW-DC-SOIL-01:** Soil quality and function sustain ecological processes.

### ***Standards***

**FW-STND-SOIL-02:** Management activities shall not create detrimental soil conditions, including loss of ground cover, severely burned soils, detrimental soil displacement, erosion, or compaction, on more than 15 percent of an activity area. In activity areas where less than 15 percent of 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 shall not exceed the conditions prior to the planned activity and shall move toward a net improvement in soil quality. The limit is not intended to apply to administrative sites or other areas with dedicated uses such as the permanent transportation system, well pads, or ski areas, for example. *See also R2 FSH 2509.25-2006-2, Management Measure 13. See also the Forestwide standard for watersheds and water resources, WTR-05.*

**FW-STND-SOIL-03:** When decommissioning roads, temporary roads, skid trails, trails, landings, burn pile scars, and non-National Forest System roads and trails, use treatment methods that have been demonstrated to improve soil productivity and quality and watershed hydrologic function. *See also Forestwide standard TSTN-04.*

### ***Guidelines***

**FW-GDL-SOIL-04:** To reduce the potential for rill or gully erosion occurring along equipment tracks, untethered, ground-based mechanical equipment should not operate on sustained slopes greater than 40 percent. *See also the RMGD section regarding riparian management zones, including fen wetlands, and FW-STND-TMBR-04.*

**FW-GDL-SOIL-05:** To maintain long-term soil quality and stability, new surface-disturbing management activities should not occur on landslide-prone areas.

**FW-GDL-SOIL-06:** To provide nutrients and reduce soil erosion, project activities should provide sufficient effective ground cover (e.g., duff, litter, and downed woody debris) so that pedestals, rills, and surface runoff from the activity area are not increased. Downed woody debris is retained per the Forestwide guideline for Key Ecosystem Characteristics, ECO-07.

**FW-GDL-SOIL-07:** To maintain the presence of biological soil crusts in the GMUG, management activities in areas with these crusts should be designed to minimize surface disturbance. *See also the Forestwide range standard RNG-06.*

### **Management Approaches**

**FW-MA-SOIL-08:** Seek opportunities to support production of biochar (a charcoal soil amendment made from biomass) from waste woody biomass generated by fuel treatments and forest restoration. When applied as a soil amendment, biochar improves soils by reducing bulk density, increasing porosity, providing a substrate for microorganisms, improving water holding capacity, retaining nutrients, and increasing organic matter, among other benefits. Producing biochar helps to mitigate climate change by storing carbon in long-lived material that would otherwise be released more quickly into the atmosphere and has the added benefits of reducing smoke and burn scars from disposal by pile burning (Rodriguez Franco et al. 2022). (*Resistance, Resilience*).

**FW-MA-SOIL-09:** Participate with the Natural Resources Conservation Service and Bureau of Land Management to complete ecological site descriptions in the GMUG. *See also FW-MA-SPEC-52.f for particular emphasis in Gunnison sage-grouse habitat.*

## **Part III: Ecosystem Services and Multiple Uses**

### **Cultural and Historic Resources (CHR)**

#### **Desired Conditions**

**FW-DC-CHR-01:** In coordination with Tribes, where sites are of interest to the Tribes; or in coordination with other local communities, for other sites: cultural resources are not only identified, protected, evaluated, and interpreted, but are also stabilized, rehabilitated, or scientifically studied for their information potential. In coordination with Tribes where applicable, cultural resources provide enduring, key ecosystem services, a sense of place and community identity, and —if appropriate— opportunities for heritage tourism.

#### **Objectives**

**FW-OBJ-CHR-02:** Within 5 years of plan approval, fire-sensitive cultural resource locations (including but not limited to historic structures, wickiups, and culturally modified trees) are identified in Heritage GIS to facilitate protective measures during wildland fire management.

**FW-OBJ-CHR-03:** Within 5 years of plan approval, identify and map populations of oshá (*Ligusticum porteri*).

## **Standards**

**FW-STND-CHR-04:** Fire-sensitive cultural resources (e.g., historic structures, wickiups, and culturally modified trees) shall be protected during prescribed fires, when feasible during wildland fires, or as requested by Tribes.

## **Guidelines**

**FW-GDL-CHR-05:** To preserve a sense of place and community identity, historic structures and buildings should be considered for adaptive reuse and/or leasing. (Repeated as Forestwide guideline for infrastructure, INFR-07).

## **Management Approaches**

**FW-MA-CHR-06:** Identify, evaluate, and protect areas identified as traditional cultural properties. Work with associated communities to collaboratively manage these areas.

**FW-MA-CHR-07:** Identify Areas of Tribal Importance, including discrete cultural landscapes, based on cultural affiliation, time period, and/or relationship with natural resources and features. *See also management approach MA-ATI-01.*

**FW-MA-CHR-08:** Develop and maintain collaborative partnerships with Tribes and other traditional communities, nonprofits, volunteers, professional organizations, and schools to assist the Forest Service in researching and managing its cultural resources. Encourage volunteer participation in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation.

**FW-MA-CHR-09:** Consider cultural resources as part of larger cultural landscapes as opposed to isolated phenomena.

**FW-MA-CHR-10:** Incorporate effects from climate change into ongoing cultural resources research, planning, and stewardship, including identification of threatened or vulnerable cultural resources, cultural landscapes, and tribally important resources with focus on development of adaptation strategies.

**FW-MA-CHR-11:** Collaborate with Tribes and partners to identify priority cultural resources vulnerable to climate change and other stressors (e.g., increased recreation, vandalism). Identify the most vulnerable cultural and historic resources in Heritage Program GIS.

**FW-MA-CHR-12:** Increase protection of significant or vulnerable cultural resources by reducing vegetation adjacent to and within cultural resource boundaries, provided that appropriate protective measures are in place. If vegetation is only removed from the surrounding landscape through, for example, thinning and prescribed burning but is left untreated proximal to cultural resources, effects from severe fire, erosion, and livestock congregation can result in impacts to cultural resources. *This management approach supports implementation of FW-STND-CHR-04.*

**FW-MA-CHR-13:** During completion of annual non-project inventory to uphold the section 110 mandate of the National Historic Preservation Act, prioritize the following:

- Areas where eligible cultural resources are threatened, or ongoing impacts are unknown.
- Areas indicated to have high cultural value or high density of cultural resources.
- Areas of importance to Tribes and traditional communities.
- Areas where new or updated surveys will contribute to a greater regional understanding of a specific management unit or special interest area.

**FW-MA-CHR-14:** Develop management and preservation plans for administrative facilities and infrastructure that are significant cultural resources with special significance and/or are sites that receive heavy visitor use.

**FW-MA-CHR-15:** Engage local communities to cultivate economic development opportunities for heritage tourism, where determined to be appropriate to the management of potentially affected cultural resources, and in consultation with Tribes as applicable.

## **Designated Trails (DTRL)**

Designated trails in the GMUG include congressionally designated trails (Continental Divide National Scenic Trail and Old Spanish National Historic Trail) and administratively designated trails (Crag Crest and Bear Creek National Recreation Trails). To incorporate the resources, qualities, values, associated settings, and primary uses of the GMUG's designated trails, each trail is mapped to include the foreground viewshed (about one-half mile from either side of the trail tread). In the forest plan, *Designated Trails* encompasses a mapped area of approximately 83,000 acres (3 percent of the GMUG) that overlie multiple other management areas. The forest plan components listed below identify applicability to the trail itself, up to one-half mile on either side of the trail (the visible foreground), or both.

## ***Congressionally Designated Trails***

### ***Management Approaches – All Congressionally Designated Trails***

**FW-MA-DTRL-A:** Consult the Old Spanish Historic Trail Comprehensive Administrative Strategy and the Continental Divide National Scenic Trail Comprehensive Plan for trail management guidance.

**FW-MA-DTRL-B:** Provide consistent signage along trails at road and trail crossings to adequately identify trails. Provide interpretive signs at key trail entry points and—if appropriate for protection of the resource—historic and cultural sites to orient visitors and enhance the visitor experience.

### ***Continental Divide National Scenic Trail***

#### **Desired Conditions**

**FW-DC-DTRL-01:** The Continental Divide National Scenic Trail is a well-defined trail traversing a natural-appearing setting along the Continental Divide. The trail provides for high-quality hiking and horseback riding opportunities, other compatible non-motorized trail activities, as well as motorized vehicle use expressly allowed by administrative regulations at the time of trail designation [16 USC 1246(c)] in a highly scenic setting along the Continental Divide. The significant scenic, natural, historic, and cultural resources along the trail's corridor are conserved. *See also the Forestwide guideline for scenery SCNY-05.*

**FW-DC-DTRL-02:** Viewsheds from the Continental Divide National Scenic Trail have high or very high scenic values; however, see FW-GDL-DTRL-07.b for exceptions for overlapping Monarch Ski Area. The foreground of the trail (up to 0.5 mile on either side) is natural-appearing, and generally appears unaltered by human activities. Where possible, the trail provides visitors with expansive views of the natural landscapes along the Divide. The potential to view wildlife is high, and evidence of ecological processes such as fire, insects, and diseases exists.

**FW-DC-DTRL-03:** The Continental Divide National Scenic Trail is well-maintained, signed, and passable.

### Objectives

**FW-OBJ-DTRL-04:** Within 10 years of plan approval, relocate the Continental Divide National Scenic Trail off of roads.

### Standards

**FW-STND-DTRL-05:** Energy and mineral materials sites shall not be allowed within the visible foreground, up to one-half mile on either side of the Continental Divide National Scenic Trail.

**FW-STND-DTRL-06:** New motorized events shall not be permitted on the Continental Divide National Scenic Trail. Existing permitted motorized events may be permitted to continue.

**FW-STND-DTRL-07:** Motorized use shall not be allowed on newly constructed segments of the Continental Divide National Scenic Trail.

### Guidelines

**FW-GDL-DTRL-07.a:** To retain or promote the character for which the trail was designated, new or relocated trail segments should be located primarily within Primitive or Semi-Primitive Non-Motorized Summer Recreation Opportunity Spectrum settings. Road and motorized trail crossings and other signs of modern development should be avoided to the extent possible. *See also recreation guideline FW-GDL-REC-16 for direction regarding recreation opportunity spectrum settings (ROS).*

**FW-GDL-DTRL-07.b:** To protect or enhance the scenic qualities of the Continental Divide National Scenic Trail, management activities should be consistent with Scenic Integrity Objectives of High or Very High within the visible foreground of the trail (up to one-half-mile of either side of the trail at a minimum). **Exception:** Where the Continental Divide National Scenic Trail overlay coincides with the utility corridor overlay and Monarch Ski Area, the scenic integrity objective is only moderate. *See also FW-GDL-SCNY-05 and plan appendix 3 – Scenic Integrity Descriptions.*

**FW-GDL-DTRL-08:** To protect or enhance the long-term scenic qualities of the Continental Divide National Scenic Trail, if management activities are projected to result in short-term impacts to the scenic integrity of the Continental Divide National Scenic Trail, mitigation measures should be included, such as screening, feathering, and other scenery management techniques to minimize visual impacts within and adjacent to the trail (within visible foreground, up to one-half-mile of either side of the trail at a minimum).

**FW-GDL-DTRL-09:** To promote high-quality scenic, primitive hiking and horseback riding opportunities along the Continental Divide National Scenic Trail, the minimum trail facilities necessary to safely accommodate the amount and types of use anticipated on any given trail segment should be provided.

**FW-GDL-DTRL-10:** To conserve natural, historic, and cultural resources, the Continental Divide National Scenic Trail should not be used for timber pile landings or as a temporary road for any purpose except where the trail is currently co-located on an open road. Hauling or skidding along a co-located portion of the trail may be allowed only when 1) no other haul route or skid trail options are available, and 2) design criteria are used to minimize impacts to the trail infrastructure.

**FW-GDL-DTRL-11:** To ensure continuous recreational access along the Continental Divide National Scenic Trail, alternate routes on the established road/trail network should be made available

in the case of temporary closures resulting from natural events, such as fire or flood, or land management activities.

**FW-GDL-DTRL-12:** To promote natural-appearing settings, unplanned fires in the visible foreground (up to one-half mile) of the Continental Divide National Scenic Trail should be managed using minimum impact suppression tactics or other tactics appropriate for the protection of national scenic trail values. Prescribed fires in the foreground of the Continental Divide National Scenic Trail should be managed to incorporate national scenic trail values. Construction of firelines by heavy equipment should not be allowed within the visible foreground of the Continental Divide National Scenic Trail unless necessary for emergency protection of life and property.

**FW-GDL-DTRL-13:** To protect the scenic values of the Continental Divide National Scenic Trail, special use authorizations for new communication sites, utilities, and renewable energy sites should not be within the visible foreground of the trail (up to one-half mile either side) and should not be visually dominant within the middleground viewshed of the trail (up to 4 miles either side).

**Exception:** the utility corridor overlay and Monarch Ski Area.

**FW-GDL-DTRL-14:** To maintain the integrity of the Continental Divide National Scenic Trail and the values for which it was designated, new linear utilities and special use authorizations that cross the trail should be avoided. Where unavoidable, these should be limited to a single crossing of the trail per special user authorization. **Exception:** the utility corridor overlay and Monarch Ski Area.

**FW-GDL-DTRL-15:** To promote a natural-appearing setting along the Continental Divide National Scenic Trail, any new temporary or permanent motorized routes (roads and trails) should only be approved if new routes are (a) required by law to provide access to private lands, (b) necessary for emergency protection of life and property, or (c) determined to be the only prudent and feasible option. In such circumstances, any project involving construction of a motorized route across or within the Continental Divide National Scenic Trail corridor should be designed in such a manner that minimizes impacts to the scenic, natural, and experiential values of the trail.

## Management Approaches

**FW-MA-DTRL-15.a:** Consult the Continental Divide National Scenic Trail Comprehensive Plan for additional management approaches and guidance.

**FW-MA-DTRL-15.b:** Collaborate with Federal, State, Tribal, county, and local governments, volunteer groups, partners, and adjacent landowners to plan, develop, relocate as needed, maintain, and manage the trail and facilities to maintain the character of the surrounding landscape, connect to adjacent communities, and support trail users.

**FW-MA-DTRL-15.c:** Evaluate proposed trail relocations using the established Continental Divide National Scenic Trail location review process.

**FW-MA-DTRL-15.d:** Monitor visitor use and resource conditions on the Continental Divide National Scenic Trail for alignment with desired conditions. Consider visitor use management strategies to maintain or achieve desired conditions. If unacceptable resource or social conditions that are moving the Trail away from desired conditions are documented, consider establishment of a visitor capacity for specific segments of the Continental Divide National Scenic Trail, and take appropriate management actions to maintain or restore the nature and purposes of the Continental Divide National Scenic Trail.



## *Old Spanish National Historic Trail*

### Desired Conditions

**FW-DC-DTRL-16:** The Old Spanish National Historic Trail is managed to maintain its nature and purpose, to sustain its historic, rugged, scenic, and spacious character, and to preserve its cultural landscapes, landmarks, and traditional cultural properties. Travelers along the trail have opportunities to learn about its history and significance, and to experience and appreciate the cultural and natural environment that traders experienced in their travels. Trailside interpretation and related visitor information services enhance visitor appreciation of the outdoors, natural resources, history, and scenic values, while also promoting stewardship and protection of the trail and cultivating economic development opportunities for heritage tourism.

### Objectives

**FW-OBJ-DTRL-17:** Within 10 years of plan approval, provide interpretive signage by at least three prominent access points along the Old Spanish National Historic Trail to enhance user experience and wayfinding.

### Standards

**FW-STND-DTRL-18:** Energy and mineral materials sites shall not be allowed within the visible foreground (up to one-half mile from the trail tread) of either side of the Old Spanish National Historic Trail.

### Guidelines

**FW-GDL-DTRL-19:** To sustain the Old Spanish National Historic Trail's historic and scenic character, unplanned fires in the visible foreground (up to one-half mile from the trail tread) should be managed using minimum impact suppression tactics or other tactics appropriate for the protection of national historic trail values. Prescribed fires in the foreground of the Old Spanish National Historic Trail should be managed to incorporate national historic trail values. Construction of firelines by heavy equipment should not be allowed within the visible foreground of the Old Spanish National Historic Trail unless necessary for emergency protection of life and property.

**FW-GDL-DTRL-20:** To maintain the integrity of the Old Spanish National Historic Trail and the values for which it was designated, new linear utilities and special use authorizations that cross the trail should be avoided. Where unavoidable, these should be limited to a single crossing of the trail per special use authorization.

## ***National Recreation Trails***

### *Desired Conditions*

**FW-DC-DTRL-21:** The Bear Creek and Crag Crest National Recreation Trails are well-maintained, signed, and passable, and conflicts among recreation uses are rare. These trails contribute to the health, conservation, and recreation goals and values of the communities in which they are located and the visitors who use them. The Bear Creek and Crag Crest National Recreation Trails provide high-quality, non-motorized recreation opportunities where visitors can experience the natural-appearing and historic landscapes of the area.

## Objectives

**FW-OBJ-DTRL-22:** Within 5 years of plan approval, complete condition surveys and initiate addressing deferred maintenance along the Bear Creek and Crag Crest National Recreation Trails.

## Energy and Mineral Resources (ENMI)

### *All Energy and Minerals Projects*

#### *Introduction*

Energy and minerals development projects are generally proponent driven. Detailed direction for managing these resources is largely found within numerous laws, regulations, policies, and existing programmatic decisions. The Forest Service works with various other federal and state permitting and regulatory agencies to authorize energy and mineral activities. Because the array of possible activities is so vast, the plan components reiterate some of legal requirements and point to other plan components to manage the resources consistent with desired conditions and management area designation. There is one additional process required by the 2012 Planning Rule: the coal unsuitability analysis, which is included as appendix 10 of this plan.

Note that oil and gas leasing availability will be completed in a separate environmental analysis process.

Additional administrative processes or internal reviews consistent with law, regulation and policy related to energy and mineral resources may be required to implement the revised forest plan, including but not limited to the management of recommended wilderness (Management Area 1.2).

#### *Desired Conditions*

**FW-DC-ENMI-01:** All energy and mineral activities are processed in a timely manner; minimize the environmental effects to other national forest resources to the extent practical through protection and mitigation measures, and adequate reclamation plans; and are processed with adequate financial assurances in place when necessary.

**FW-DC-ENMI-02:** Abandoned and inactive mines disturbed by past mineral exploration and mine development have been returned to stable conditions and an appropriate, functioning vegetative state, and do not pose health, safety, or environmental hazards. *See also the Forestwide guidelines for bats, SPEC-10 and -11.*

*See also chapter 1, "Distinctive Roles and Contributions" and the desired condition for the social and economic environment, SCEC-01.*

**FW-OBJ-ENMI-02.a:** Reclaim or address one abandoned mine land (AML) feature each year to protect water quality, classified water uses, and/or public health or safety.

#### *Standards*

*See also the Watersheds and Water Resources section.*

**FW-STND-ENMI-03:** Reclamation plans will be developed and designed to return the land to productive uses consistent with ecological goals, or to support other management activities once exploration, development, or production activities are complete. Structures erected to support the permitted mining and minerals activity shall be removed unless necessary for ongoing resource

monitoring or protection. Reclamation bonds must not be released until monitoring demonstrates reclamation success to a level defined in the reclamation plan. *See specific direction in 36 CFR 228.*

**FW-STND-ENMI-04:** Permanent structures, residency, or occupancy for minerals purposes are limited to only those that are necessary and incidental to approved mining and/or minerals operations.

### **Guidelines**

**FW-GDL-ENMI-05:** To minimize long-term monitoring and maintenance requirements, mine reclamation should use a geomorphic approach that results in landforms similar to adjacent natural terrain and hydrologic functions similar to natural systems.

### **Locatable Minerals**

*With regard to locatable minerals requirements, see direction in 36 CFR 228 Subpart A, the applicable Wilderness Act(s), and other applicable direction.*

### **Salable Minerals (Also Known As Mineral Materials)**

*With regard to salable minerals requirements, see direction in 36 CFR 228 Subparts B and C.* Relevant forest plan direction identified for numerous other resource areas shall be applied in the form of conditions of approval, project design features, or other project requirements.

*See also the Forestwide standards for Designated Trails, DTRL-05 and -18.*

### **Leasables – Energy and Mineral Resources Including Oil and Gas, Coal, Geothermal, and Others**

Existing oil and gas, coal, and geothermal leases contain stipulations that were established at the time they were issued. These lease stipulations are unaffected by the revised plan.

### **Standards**

Specific to leasing actions, the following standards apply:

**FW-STND-ENMI-06:** There will be no additional oil and gas leasing until a new oil and gas leasing availability decision is issued; this moratorium does not affect actions on existing leases.

**FW-STND-ENMI 06.a:** Regarding oil and gas leasing availability per 36 CFR 228.102(c) or as subsequently modified, identify those areas that will be:

- Open to development subject to the terms and conditions of the standard oil and gas lease form...,
- Open to development but subject to constraints that will require the use of lease stipulations such as those prohibiting surface use on areas larger than 40 acres or such other standards as may be developed in the plan for stipulation use..., and
- Closed to leasing, distinguishing between those areas that are being closed through exercise of management direction (the forest plan) and those closed by law and regulation.

**FW-STND-ENMI-07:** Ensure that new mineral leases within Colorado roadless areas are consistent with the Colorado Roadless Rule (36 CFR 294.46) *See also direction for MA 3.1.*

**FW-STND-ENMI-08:** The unsuitability analysis per 43 CFR 3461 will be conducted at the project level when considering specific lands for coal leasing. *See also plan appendix 10, Coal Unsuitability Analysis.*

**FW-STND-ENMI-09:** All new leasable mineral actions shall include applicable surface use and occupancy stipulations to protect National Forest System lands consistent with plan direction. Associated operational proposals shall include appropriate conditions to mitigate surface uses per plan direction. Per 36 CFR 228.107(a) or as subsequently amended, at the stage of the surface use plan of operations or master development plan for an oil and gas project, the authorized Forest officer shall review the plan of operations to ensure:

- The surface use plan of operations is consistent with the lease, including the lease stipulations, and applicable Federal laws,
- To the extent consistent with the rights conveyed by the lease, the surface use plan of operations is consistent with, or is modified to be consistent with this forest plan,
- The surface use plan of operations meets or exceeds the surface use requirements of 36 CFR 228.108, and
- The surface use plan of operations is acceptable, or is modified to be acceptable, to the authorized Forest officer based upon a review of the environmental consequences of the operations.

*See other plan direction included in, but not limited to, the sections Aquatic Species and Habitat, Riparian Management Zones and Groundwater-Dependent Ecosystems, and Watersheds and Water Resources; Infrastructure; Native Species Diversity; all Management Area prescriptions, Recreation Opportunity Settings; Scenic Integrity Objectives; Soil Resources; Trails.*

## **Additional Direction**

### ***Geothermal***

*See plan appendix 5, Relevant Federal Statutes, Regulations, Policies, and Agreements, Other Management.* Management is guided by the Final Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (USDI BLM and USDA Forest Service 2008), or any subsequently adopted programmatic analysis for regional geothermal leasing, unless more restrictive stipulations are prescribed by the GMUG.

Relevant forest plan direction identified for numerous other resource areas shall be applied in the form of conditions of approval, project design features, or other project requirements.

### ***Solar and Wind***

Solar and wind are addressed under special use management direction in agency policy in FSH 2709.11 chapter 70 and FSM 2726.23. Relevant forest plan direction identified for numerous other resource areas shall be applied in the form of conditions of approval, project design features, or other project requirements.

### ***Hydroelectric***

Hydroelectric plants are operated under special use management direction in agency policy in FSM 2770 and FSH 2709.15 chapter 60, authorized under several acts (Federal Power Act of June 20, 1920, Acts of March 3, 1899, and June 25, 1910, and Energy Policy Act of October 24, 1992) and

codified in 7 CFR section 2.60(a)(28). Relevant forest plan direction identified for numerous other resource areas shall be applied in the form of conditions of approval, project design features, or other project requirements.

### ***Energy Infrastructure***

Energy infrastructure is authorized under the detailed requirements of the applicable special uses or minerals laws, regulations, and policies. Relevant forest plan direction identified for numerous other resource areas shall be applied.

## **Infrastructure (INFR)**

### ***Infrastructure – General***

Applies to all infrastructure: fire, administrative, and other – range; recreation; cultural and historical facilities; and permitted special use infrastructure. *See below for direction specific to utility corridors and communication sites.*

### ***Desired Conditions***

**FW-DC-INFR-01:** Safe, accessible, functionally efficient, aesthetically pleasing, energy-efficient, and cost-effective buildings and related facilities (owned, operated, occupied, or authorized by the Forest Service) needed to achieve resource management objectives are maintained or constructed; unneeded facilities are decommissioned.

**FW-DC-INFR-02:** Infrastructure is resilient to climate change and extreme weather events. *See complementary management approaches FW-MA-INFR-09 and FW-MA-INFR-10.*

**FW-DC-INFR-02.a:** Facilities meet all applicable health, safety, and accessibility standards.

### ***Objectives***

**FW-OBJ-INFR-03:** Every 10 years, complete one action in vulnerable and/or poor or impaired watersheds, as identified in the *GMUG Watershed Vulnerability Assessment* (USDA Forest Service 2013a) and the watershed condition framework ratings, to reinforce existing Forest Service infrastructure to withstand extreme weather events. *See supporting management approaches for more detail. See also the Forestwide desired conditions for water resources, WTR-01 and WTR-02.*

### ***Standards***

**FW-STND-INFR-04:** Structures, signage, and other built environment elements reflect the style and character that blends with the local environment and are consistent with the scenic character for the given area. *See also the Scenery section.*

**FW-STND-INFR-06:** Building leases, facility development, and facility maintenance contracts will require treatment and integrated management of invasive species. *See also the Invasive Species section.*

*See also Forestwide standard RMGD-08.*

## Guidelines

**FW-GDL-INFR-07:** To ensure that infrastructure operations in the GMUG are sustainable, historic structures and buildings should be considered for adaptive reuse and/or leasing. *(Repeated as the Forestwide guideline for cultural and historic resources, CHR-05).*

*See also guidelines specific to infrastructure within the plan section Riparian Management Zones and Groundwater-dependent Ecosystems: FW-STND-RMGD-09.b, FW-GDL-RMGD-10.b through 10.f, and GDL-RMGD-11 and 11.a.*

*See also the Forestwide guideline for scenery, SCNY-06: To maintain scenic character for concern level 1 routes, large facilities (including, but not limited to, powerlines, gas wells, and power stations) should be avoided within the immediate foreground of the route (300 feet), unless such infrastructure can be fully screened (e.g., with vegetation and topography). Exception: where such routes intersect the utility corridor overlay or other established rights-of-way or for any recreation infrastructure, facilities can be located within this buffer, but they should be blended to the extent possible and be consistent with the established scenic integrity objective for the area.*

*See other Forestwide guidelines especially pertinent to infrastructure management: RMGD-14; AQTC-04, 05, 07, 10; SPEC-04, 06, 18, 25, 26 and the entirety of the direction within the Gunnison sage-grouse section.*

## Management Approaches

**FW-MA-INFR-08:** Manage all Forest Service facilities according to the Facilities Master Plan.

**FW-MA-INFR-09:** To manage toward desired conditions for infrastructure that is resilient to climate change and extreme weather events (FW-DC-INFR-02), to implement actions to reinforce existing infrastructure to withstand such events (FW-OBJ-INFR-03), and to reduce the risks and negative impacts of uncharacteristic wildland fire to infrastructure (FW-OBJ-FFM-02), geographically prioritize actions, as informed by the *GMUG Watershed Vulnerability Assessment* (USDA Forest Service 2013a) (*Resistance, Resilience*). This assessment identified the following, in summary:

- Subwatersheds where transportation infrastructure and water use-related structures (dams, reservoirs, ponds, ditches, diversions) are most vulnerable are in the San Juans and Upper Taylor Geographic Areas (p. 106). Nine subwatersheds in the San Juans are rated as the most high-risk (339,700 acres); three subwatersheds encompassing an even larger area (476,900 acres) are identified as the most high-risk in the Upper Taylor Geographic Area (p. 110).
- Infrastructure construction and reconstruction in subwatersheds with high risk may need to be designed to handle higher flood levels or located in less vulnerable areas (p. 112).

**FW-MA-INFR-10:** Apply best management practices identified in the *Regional-Scale Climate Change Vulnerability Assessment for Infrastructure in the Rocky Mountain Region* (USDA Forest Service 2015b), including, but not limited to:

- Size structures to match the morphology of streams, using the bankfull dimensions. While still appropriate to consider the 100-year flood level, the bankfull approach is a preferred approach in the context of a rapidly changing climate (p. 105) (*Resilience*). *See also related plan direction FW-GDL-RMGD-10.e and FW-GDL-RMGD-10.f.*

**FW-MA-INFR-11: Sustainable Operations:** To reduce the agency's environmental footprint, improve operational resilience, and save money and other vital resources, continue and expand sustainable operations. In coordination with regional and national efforts, strive to make measurable annual progress in energy conservation and renewable energy, water conservation, waste prevention

and recycling, sustainable acquisition, sustainable fleet management, and sustainability leadership (*Resistance, Resilience*).

### **Utility Corridors and Communication Sites (UC)**

In the forest plan, utility corridors encompass a mapped area of about 47,800 acres (1.5 percent of the GMUG) that overlie multiple other management areas. Corridors encompass both designated West-wide energy corridors and other local, non-West-wide-energy corridors. Corridors are defined by a centerline and a specified width. The identification of corridors does not authorize any projects, mandate that future projects be confined to the corridors, or preclude the agency from denying a project in a designated corridor.

*See also the Lands and Special Uses section for pertinent direction.*

### **Desired Conditions**

**FW-DC-UC-01:** Utility corridors, communication sites, and administrative sites used for communications encompass and concentrate existing and potential future infrastructure for aerial and underground electric and communications facilities, including but not limited to communication towers, fiber optic lines, oil and gas transmission pipelines, water pipelines greater than 12 inches in diameter, and trans-mountain water diversion systems (excluding reservoirs). Concentration of infrastructure within the corridors and sites reduces the proliferation of infrastructure across the landscape and minimizes the environmental footprint from development. Although other multiple uses may occur within these areas, the management emphasis is primarily to support infrastructure. Active vegetation management maintains safe and defensible space for existing infrastructure (e.g., fuels reduction treatments and hazard tree removal).

### **Standards**

**FW-STND-UC-02:** West-wide energy corridor direction and interagency operating procedures for such corridors are incorporated by reference as mandatory requirements (USDA Forest Service 2009), with the following modifications:

- Deletion of West-wide energy corridors 130-274 and 130-274(E).
- West-wide energy corridor 87-277: *See the At-Risk Species, Gunnison sage-grouse section of the plan for direction related to Gunnison sage-grouse.*
- West-wide energy corridor 134-136: Infrastructure shall be underground only for the segment to/within the Roubideau Area (Milepost 1-9).

### **Guidelines**

*See also direction in the Transportation section, including cross-references.*

**FW-GDL-UC-03:** To minimize impact on affected resources and streamline special use authorizations within utility corridors that are not designated West-wide energy corridors, the interagency operating procedures from the West-wide Energy Corridor Record of Decision (USDA Forest Service 2009) should be applied, as relevant, to special use authorizations and reauthorizations.

**FW-GDL-UC-04:** To minimize the acres encumbered and associated environmental and scenic impacts, communication and utility infrastructure should be co-located and/or existing sites should be expanded. Where not possible, lines should be buried, unless:

- burial within National Forest System lands is incompatible with adjacent overhead lines or other utilities, or
- burial is not technically, economically, or geologically feasible or greater long-term disturbance would result.

### *Management Approach*

**FW-MA-UC-05:** Cooperate with utility providers to expedite vegetation management needed to meet industry standards for public safety, protection of property, and reliability.

## **Lands and Special Uses (LSU)**

### *Lands*

#### *Desired Condition*

**FW-DC-LSU-01:** National Forest System lands are consolidated, providing reasonable access and efficiency of land management while protecting resource values. All National Forest System roads and trails that access National Forest System lands or cross private inholdings have legal access or a documented right-of-way, and boundary lines and property corners are easily locatable.

### *Management Approaches*

**FW-MA-LSU-01.a:** Prioritize land acquisitions meeting one or more of the following criteria to create more manageable units, set aside nationally significant areas, and help achieve broader resource protection goals:

- Lands and associated riparian ecosystems on water frontage such as lakes and major streams,
- Important wildlife habitat needed for the protection of federally listed endangered or threatened fish, wildlife, or plant species, including designated critical habitat. Supports objective of protection of fish and wildlife habitats,
- Lands identified to facilitate wildlife movement and habitat connectivity, including in the vicinity of highway and road crossings,
- Lands needed for the protection of significant historical or cultural resources, when these resources are threatened or when management may be enhanced by public ownership,
- Lands that enhance recreation opportunities, public access, and protection of aesthetic values,
- Lands needed for protection and management of congressionally designated areas including wilderness and national scenic and historic trails, and administratively designated areas including national recreation trails and Colorado roadless areas,
- Lands needed to enhance or protect watershed improvements that affect the management of riparian areas on National Forest System lands,
- Environmentally sensitive lands such as wetlands and old forest/old growth,
- Lands important to timber resource management, or
- Lands that promote more effective management of the ecosystem and reduce administrative expenses through consolidation of National Forest System lands or ownership of split estates.

**FW-MA-LSU-01.b:** Prioritize land conveyances by the following criteria (in no particular order):



- Parcels that will serve a greater public need if owned by a county, city, or qualified non-governmental organizations, or managed by another Federal agency, including in support of the development of affordable housing.
- Inaccessible parcels isolated from other National Forest System lands. Parcels intermingled with private lands.
- Parcels within major blocks of private land or intensively developed private land, the use of which is substantially for non-Forest Service purposes.
- Parcels having boundaries, or portions of boundaries, with inefficient configurations (e.g., projecting necks or long, or narrow strips of land). Supports more logical and efficient management.
- Avoid adjustments that predominantly benefit the proponent.

**FW-MA-LSU-01.c:** Consider the benefit of acquiring lands with infrastructure, legacy mining waste, and water rights the federal government would assume responsibility for maintaining, addressing, and using.

**FW-MA-LSU-01.d:** Cooperate with adjacent federal land management agencies to transfer management of lands where doing so would gain management efficiency and maximize public benefit.

## **Access**

### ***Standards***

**FW-STND-LSU-02:** For access requests, issue Federal Land Policy and Management Act of 1976 permits (which do not convey any interest in real property, are not transferable, and are issued for a set term) to ensure the minimum encumbrance on National Forest System lands necessary to facilitate the use. Federal Land Policy and Management Act easements shall not be granted to simply avoid future permit reissuances or other similar action. Grant easements according to existing regulations and policy found 36 CFR 251, FSM 2700, FSH 2709.12, and FSM 5400.

**FW-STND-LSU-03:** Only a single access road or trail to private property shall be granted. Exception: additional access would result in a demonstrated public benefit, including but not limited to acquisition by the United States of additional or reciprocal public access to National Forest System or public lands.

### ***Guidelines***

**FW-GDL-LSU-04:** To improve processing efficiency, for roads providing access to more than one parcel, the special use permit should be issued to any existing road users association or homeowners association.

### ***Management Approaches***

**FW-MA-LSU-04.a:** Work with local county government to grant Forest Road and Trail Act easements on roads serving predominantly non-Forest Service purposes.

**FW-MA-LSU-04.b:** To improve accessibility for the public on National Forest System lands in the GMUG and also to adjacent public lands and waters, prioritize road and trail rights-of-way acquisitions meeting at least one of the following criteria:

- Identified as a priority by and in cooperation with local governments and State and Federal agencies, and/or
- Improves access for recreational uses including hunting, fishing, boating, and trail uses.

**FW-MA-LSU-04.c:** To maintain existing access to National Forest System lands from historic roads, the Forest Service will work with counties in the event of potential loss of such historic access. Such historic roads are public roads rather than National Forest System roads unless there is an express easement to the United States or a reservation in a conveyance from the United States.

## ***Special Use Permits***

*See also the plan section Infrastructure and associated cross-references.*

## ***Standards***

**FW-STND-LSU-05:** Special uses that can reasonably be met on private lands shall not be approved unless they are in the public interest. Uses of National Forest System lands that are in public interest include, but are not limited to, utilities, public transportation routes, renewable energy, or other uses as directed by law.

**FW-STND-LSU-06:** The Forest Service shall not grant permits for requests for new apiaries (specified in FSH 2709.11, chapter 10, use code 214). *See also the Forestwide desired condition for pollinators, SPEC-08.*

*See also Forestwide standard for invasive species IVSP-04.*

## ***Guidelines***

**FW-GDL-LSU-07:** To reduce the number of acres encumbered, structures associated with special uses should be concentrated, paralleled, or co-located on existing sites or designated corridors.

## ***Management Approaches***

**FW-MA-LSU-07.a:** To maximize public benefit of the special use program, as much as feasible prioritize addressing special use requests in the following order:

- Those related to public safety (e.g., emergency communication infrastructure or upgrades to meet safety standards).
- Those contributing to the general public benefit (e.g., public access; a reliable supply of electricity, natural gas, or water; a communication network or broadband).
- Those that benefit only private users (e.g., road permits, special use authorizations for an individual's powerlines, telephones, or waterlines).

**FW-MA-LSU-07.b:** When reviewing authorizations and reauthorizations for water developments in the GMUG, or the water rights filings of others on National Forest System lands (conditional, absolute, change, augmentation, and exchange), the GMUG's role is to ensure: 1) the appropriate National Forest System land use authorization is in place, 2) the water use development has the appropriate state authorization, 3) that the application will not injure Forest Service water rights and 4) the forest resource is protected to the maximum extent possible. *See also FW-GDL-RMGD-11.a regarding restrictions related to wetlands. See also the management approach FW-MA-WTR-08.*

## **Boundary Lines, Title Claims, and Encroachments**

### **Standards**

**FW-STND-LSU-08:** Boundary lines shall be surveyed, marked, and recorded in support of land and resource management objectives, in response to litigation, and to resolve encroachment.

**FW-STND-LSU-09:** The Forest Service will work cooperatively with private landowners to address boundary survey needs, with survey needs that protect and preserve Federal ownership and resources having the highest priority and those that primarily benefit the private landowner having the lowest priority, and cost-sharing authorities will be applied to their fullest extent.

### **Management Approaches**

**FW-MA-LSU-09.a:** Cooperate with private landowners to address boundary survey needs. Prioritize surveys that protect and preserve federal ownership and high-priority resources. Apply cost-sharing authorities to their fullest extent.

**FW-MA-LSU-09.b:** To resolve title claims and encroachments, prioritize those meeting one or more of the following criteria:

- Those with the longest tenure in having been discovered or established,
- Those that affect the greatest amount of National Forest System land,
- Those that involve structures that cannot be simply removed,
- Those that adversely affect significant historic or cultural resources; important wildlife habitat, riparian areas, wetlands, or rivers; or public access to or use of National Forest System land, or
- Those that pose a threat to public safety or cause damage to resources.

## **Rangelands, Forage, and Grazing (RNG)**

### **Desired Conditions**

**FW-DC-RNG-01:** Permitted livestock grazing on National Forest System lands contribute to the stability and social, economic, and cultural aspects of rural communities while maintaining or achieving desired ecological conditions, including the availability of forage for wildlife and regulating ecosystem services such long-term storage of carbon. *See Forestwide desired conditions for Native Species Diversity SPEC-02 and SPEC-36, and for the social and economic environment, SCEC-01.*

**FW-DC-RNG-02:** Ground cover percentages by functional group (forbs, graminoids, shrubs, trees) in rangelands are within reference community ranges specified in the relevant Natural Resources Conservation Service Ecological Site Description.

**FW-DC-RNG-02.a:** Where permitted livestock grazing has access to riparian areas, grazing of riparian species maintains those species, allows for vegetation regeneration, maintains bank and soil stability, and reduces the effects of flooding. Maintenance of woody riparian species leads to diverse age classes of woody riparian species where potential for native woody vegetation exists.

## Objectives

**FW-OBJ-RNG-03:** At least annually, maintain ecological integrity and productivity of all ecotypes by evaluating allotment management with permit holders to adjust timing, intensity, duration, and frequency of livestock grazing when necessary to respond to changing ecological conditions or resource concerns such as drought, delayed snowmelt, extended forage season, wildfire, prescribed fire.

**FW-OBJ-RNG-04:** Within 10 years of plan approval, remove woven wire fencing in priority locations and where it is no longer needed (e.g., closed allotments, active or vacant cattle allotments unlikely to be converted to sheep allotments, within Gunnison sage-grouse critical habitat, to facilitate research, or forage utilization exclosures), after consulting with grazing permittees, GMUG resource specialists, and Colorado Parks and Wildlife to determine priorities and feasibility.

## Standards

*See also the forest plan sections Key Ecosystem Characteristics, Terrestrial Ecosystems and Vegetation, Riparian Management Zones and Groundwater-Dependent Ecosystems, Watersheds and Water Resources, Native Species Diversity – bighorn sheep direction within Big Game subsection, and Native Species Diversity – Gunnison sage-grouse for direction particularly specific to rangeland management, but this list is not exhaustive.*

**FW-STND-RNG-05:** Sufficiency reviews shall be conducted at a pace to ensure that decisions for allotment management plans are current with the best available science and changed conditions. Second to prioritization of allotments overlapping at-risk species habitat, sheep allotments with the potential for bighorn sheep to interact with domestic sheep should be prioritized for review. *See also the section Native Species Diversity, Big Game, Bighorn Sheep for direction and adaptive management approaches.*

**FW-STND-RNG-06:** No salting or mineral supplementation shall occur within 0.25 mile of known populations of at-risk plant species, designated critical habitat of federally listed plant species, prairie dog colonies, water bodies, or other riparian areas. No salting or mineral supplementation shall occur on highly erosive soils or biological soil crusts; roads; recreation trails; or in known archeological sites and other historic properties. *See also the Forestwide guideline for soils, SOIL-07. Exception:* If there would be no practical remaining locations for salt or supplements in a given pasture, district range and interdisciplinary staff shall work with permittees to determine a least impactful location for the resources listed within this standard.

**FW-STND-RNG-07:** Prior to authorizing grazing following wildland fire, restoration work, or seeding, Forest Service staff shall confirm range readiness on a case-by-case basis utilizing ecological condition, best management practices, desired conditions, and best available scientific information. Livestock use may be authorized for rehabilitation treatments (e.g., to prepare a site before seeding, incorporate seed and organic matter into the soil, or remove noxious weeds).

**FW-STND-RNG-08:** Livestock grazing intensity, timing, duration, and frequency, as a tool for managing herbaceous vegetation, shall be determined using site-specific environmental analysis and decisions and/or data gathered from implementation and effectiveness monitoring to achieve desired conditions. In the absence of a site-specific decisions and/or data, grazing management systems should not exceed a long-term average of conservative to moderate utilization, 31-50 percent (Holechek et al. 2006). The grazing management systems, considered with trend monitoring data and all factors contributing to the site condition over time, shall be analyzed to determine the proper use, proper use factors, and carrying capacity (Smith et al. 2016). *See glossary for key terms.*

**FW-STND-RNG-08.a:** To maintain proper functioning riparian areas, including the maintenance of bank stability and cover, livestock shall be removed from deferred-rest rotation grazing areas when the average stubble heights of *Carex* species reach 3 to 4 inches (7 to 10 cm) in spring-use pastures and 4 to 6 inches (10 to 15 cm) in summer and fall use pastures for season-long grazing management (FSH 2509.25 2006). In riparian areas, permitted livestock utilization shall not exceed 30 percent of the current year's total herbaceous growth by weight. If livestock grazing is determined to be the causal factor for impaired riparian-wetland function (*see STND-RNG-08.b below*), rest periods and adaptive management to adjust timing, intensity, frequency, and duration will be implemented to improve site condition. *Within western toad (previously named the "boreal toad") breeding habitat, avoidance of certain stream reaches during certain timeframes is required—see FW-GDL-SPEC-22.a. See plan appendix 12 for supporting science.*

**FW-STND-RNG-08.b:** If riparian management zones are functioning at-risk as defined in the appropriate technical report and grazing is determined to be a causal factor, implement appropriate actions in the corresponding range allotment annual operating instructions and/or allotment management plans to move the riparian areas toward the proper functioning condition. To achieve this, assess the function of riparian management zones during rangeland management analysis. The Rosgen quantitative stream classification system, or other best available scientific information, should also be used to identify stream types more sensitive to livestock grazing. *See FW-STND-RMGD-07 for definition of riparian management zones.*

## Guidelines

**FW-GDL-RNG-09:** To minimize bank destabilization and associated sedimentation and to maintain overall riparian ecosystem integrity, new and revised range allotment management plans and annual operating instructions should follow Watershed Conservation Practices Handbook (FSH 2509.25), or other best available direction.

**FW-GDL-RNG-10:** To allow desirable forage plants time to recover (grow) following livestock grazing and to retain sufficient vegetative stubble to provide cover litter and forage for wildlife and soil, grazing systems should be designed so that plants are generally not grazed more than once a season, not grazed the same time every year, and not during the entire vegetative growth period (season-long grazing), except where determined necessary to achieve or maintain desired ecological conditions.

**FW-GDL-RNG-11:** To minimize soil compaction and impacts to alpine and riparian areas and at-risk species, bed grounds for sheep should be located on rocky or otherwise hardened sites and be located at least 0.25 mile away from riparian management zones, at-risk or rare plant species, known at-risk butterfly habitat, or known ptarmigan habitat. Trailing sheep through these sensitive areas should be avoided. *See also the Forestwide desired condition for at-risk species, SPEC-22.*

**FW-GDL-RNG-11.a:** To maintain ecological integrity of streams, maintain the extent of stable banks in each stream reach at 74 percent or more of reference conditions per the Watershed Conservation Practices Handbook (FSH 2509.25), or as consistent with other best available science.

**FW-GDL-RNG-12:** To minimize unintended wildlife impacts, range allotment annual operating instructions should require that new and updated livestock infrastructure incorporate best management practices in the Watershed Conservation Practices Handbook (FSH 2509.25), and as recommended by Colorado Parks and Wildlife (Hanophy 2009), e.g., installing wildlife escape ramps in troughs, designing ponds with a gentle slope to avoid entrapping animals, covering open-topped water storage tanks, wire spacing on fencing to avoid wildlife entrapment. *See also the Forestwide guidelines for habitat connectivity SPEC-06 and the range objective RNG-04.*

**FW-GDL-RNG-12.a:** To maintain ecological integrity of springs and the ecological conditions for associated at-risk species, maintenance or improvement of existing spring developments should be prioritized over development of new springs. If new spring developments are necessary, springs that support at-risk species should not be selected for development.

**FW-GDL-RNG-13:** To maintain quality and quantity of water flows to, within, or between groundwater-dependent ecosystems, spring developments should have spring orifices, points of diversion, pools, and lengths of runout channels protected (e.g., excluded with fences or barriers) from livestock trampling. Consider flow controls to limit the quantity of diverted water to that needed by the livestock. *See supporting management approach FW-MA-RNGD-19. See also the Forestwide guideline for groundwater-dependent ecosystems RMGD-14.*

## **Management Approaches**

**FW-MA-RNG-14:** Use short- and long-term monitoring methods to determine if grazing objectives for each allotment, as identified through the environmental analysis process and defined in their allotment management plan, are being met. If short-term monitoring shows that objectives aren't being met, rangeland management personnel and grazing permittees work together to adjust the timing, frequency, and/or intensity of livestock grazing to meet objectives via the range allotment annual operating instructions. If long-term monitoring reflects the same, rangeland management personnel and grazing permittees work together to change management direction in the allotment management plan, whether via sufficiency review or new environmental analysis. Examples of short-term monitoring methods and indicators include utilization levels, grazing response index, and canopy cover. Examples of long-term monitoring methods include those described in May 2014; Holechek 1988; Holechek et al. 2010; Rangeland Analysis Training Guide, 1996; Colorado Rangeland Monitoring Guide (Colorado Cattlemen's Association 2014); and the Gunnison Sage-grouse Rangewide Conservation Plan (Gunnison Sage-grouse Rangewide Steering Committee 2005).

**FW-MA-RNG-15:** To reduce negative economic impacts related to livestock grazing activities on National Forest System lands, provide advance notice of at least 1 year to permittees prior to implementing a vegetation treatment that would affect rangeland vegetation within a proposed project area and/or may require reduced grazing use or rest periods.

**FW-MA-RNG-16:** Apply targeted grazing to support specific hazardous fuels reduction and prescribed fire treatments, where appropriate (*Resilience*).

**FW-MA-RNG-17:** Monitor livestock grazing in streamside riparian areas and in fens and other wetlands per protocols outlined in a) Weixelman and Cooper 2009; b) USDI BLM; USDA FS; USDA NRCS. 2015. c) USDI. 2020, or other best available scientific information). Consider utilization and potential soil trampling, soil hummocking, and pedestaling. *See plan appendix 12 for full citations. Supports implementation of FW-STND-RNG-08.b and GDL-RNG-11.a.*

**FW-MA-RNG-18:** As riparian management zone inventories proceed, incorporate mapped locations of riparian management zones, including fens and other wetlands, into annual management plans, annual operating instructions, and other grazing management documents to facilitate monitoring and management.

**FW-MA-RNG-19:** Apply best practices outlined in RMRS-GTR-405 (Gurrieri 2020) to develop springs in the GMUG, or per other best available scientific information. Rehabilitate or decommission obsolete spring developments when opportunities arise, such as during Allotment Management Plan revision, NEPA sufficiency review, and BMP review.

**FW-MA-RNG-20:** As conflicts between livestock grazing and recreation are identified, mitigate through education of recreation user groups or other techniques to promote coexistence of these multiple uses.

**FW-MA-RNG-21:** Restore and maintain native rangeland vegetation, especially species adapted to climate change (*Resistance, Resilience*).

## Recreation and Trails

### **Recreation (REC)**

*See also the plan sections Designated Trails; Infrastructure; Trails; and Transportation System and chapter 3, Management Area direction for Recreation Management Areas (MAs 4.1 and 4.2) for additional related direction.*

### **Desired Conditions**

**FW-DC-REC-01:** The GMUG provides a variety of high-quality, year-round recreation opportunities across a range of resilient recreation settings—from primitive to rural, and gradients between. Recreation opportunities and facilities (1) meet persisting and evolving needs of diverse user groups, (2) accommodate adjusted management as advancements in recreational equipment technologies make way for new and different uses, (3) are inclusive of a culturally diverse population, (4) are inclusive of populations historically under-represented in recreation use in the GMUG, (5) are accessible to persons with disabilities, wherever feasible and, (6) are adaptive to a changing climate, including increases in disturbances, warmer temperatures, changing hydrologic patterns, and other impacts. Unique cultural, historical, and ecological resources are featured through recreation opportunities, education, and interpretation, which connect visitors to the past, present, and future of the national forest landscapes.

**FW-DC-REC-02:** Recreation is managed to achieve a sustainable balance with other resources, uses, and management activities (e.g., wildlife habitat; vegetation management; rangeland management). Impacts to the social and biophysical environments from recreational use are limited, monitored, and well-managed, and recreationists consistently enjoy positive visitor experiences. Most visitors are focused in recreation management areas (recreation emphasis areas and mountain resorts), where the primary focus of management decisions and activities is related to recreation. Outside of those emphasized use areas, the GMUG provides for a myriad of other developed and dispersed recreation opportunities for a variety of recreation uses.

*See also “Why the GMUG Matters: Distinctive Roles and Contributions in the Larger Landscape” and the Forestwide desired condition for the social and economic environment, SCEC-01.*

### **Objectives**

**FW-OBJ-REC-03:** Annually, manage developed recreation sites to National Quality Standards for at least 900,000 persons at one time.

**FW-OBJ-REC-04:** Within 10 years of plan approval, enhance the resiliency of alpine ecosystems on at least 100 acres of GMUG lands by implementing recreation management plans and/or road and trail decommissioning. *See the Forestwide desired condition for Key Ecosystems Characteristics ECO-03.*

**FW-OBJ-REC-05:** Within 10 years of plan approval, at a minimum of five recreation sites, improve design to meet the Forest Service Outdoor Recreation Accessibility Guide or comparable direction. Over the life of the plan, meet accessibility guidance at all developed recreation sites.

**FW-OBJ-REC-06:** Eliminate and rehabilitate at least one unauthorized travel route annually.

## Standards

**FW-STND-REC-07 (dispersed overnight use):** Designate or otherwise manage to address dispersed campsite issues (e.g., temporarily close and rehabilitate; institute a permit system; prohibit overnight use via closure order; develop a visitor use management plan; provide stewardship education; or harden for longer-term, more concentrated use) when use levels and/or type result in unacceptable social and/or biophysical impacts. Examples of unacceptable biophysical and social impacts are outlined in the bullets below. *When addressing campsites, see “Riparian Management Zones and Groundwater-Dependent Ecosystems” section and infrastructure standard FW-STND-INFR-05 for more detailed information. See also Recreation Management Approaches section below for more information regarding implementation.*

- *Social impacts:* Observable indicators of unacceptable social impacts include unsustainable use levels or types exhibited by the expansion of dispersed campsites. Expansion includes the growth of both the size and number of campsites, and signals that the existing infrastructure is crowded and overflowing during peak periods. Other indicators of social impacts include considerably decreased visitor satisfaction, persistent use conflicts, reduced safety, and/or unauthorized use.
- *Biophysical impacts:* Measured at the scale of a drainage or localized geographic area such as a road or waterbody, unacceptable biophysical impacts include a cluster of 15 or more campsites, with multiple campsites rating over a 6 on the overall impact rating using the National Minimum Recreation Site Monitoring Protocol (or currently accepted best practice). Clusters of fewer than 15 campsites (with multiple sites rating over a 6) could also yield unacceptable biophysical impacts in certain locations, circumstances, and ecosystems. Observable indicators of unacceptable biophysical impacts include sparse ground vegetation due to soil compaction, widespread bare mineral soil, evident soil erosion, and/or ruts channeling water in wetlands. Additional signs of impacts may include exposed tree roots and/or reduced vegetation vigor. Further indicators of biophysical impacts may include modified wildlife behavior (avoidance, habituation, attraction, and/or displacement), modification or loss of wildlife habitat, shelter, or movement routes, or decrease in species population. Water quality degradation from unmanaged sanitation issues (e.g., trash accumulation and human waste) is also a clear indicator of unacceptable biophysical impacts with associated social impacts.
- Other considerations that may inform dispersed overnight use management could include concerns voiced from local communities, partners, and/or user groups.

**FW-STND-REC-08 (dispersed day use):** Institute responsive management actions in day-use areas when unacceptable biophysical and/or social impacts occur. Examples of unacceptable social and/or biophysical impacts are outlined in the bullets below. The diverse range of possible management actions may include, but would not be limited to, developing a site-specific visitor use management plan; adjusting infrastructure, signage, and/or amenities; implementing a permit, fee, or reservation system; allocating use-type days (e.g., odd calendar days or only Wednesday through Saturday for certain uses); a seasonal closure; and/or seeking partnership opportunities to limit impacts (e.g., transit solution, stewardship education, or maintenance assistance). *See also Recreation Management Approaches section for more information regarding implementation.*

- *Social impacts:* Indicators of unacceptable social impacts include unsustainable use levels or types as indicated by considerably decreased visitor satisfaction, persistent use conflicts, parking



issues (e.g., congestion, reduced safety, and unauthorized use), and/or evident burden on other existing infrastructure.

- *Biophysical impacts:* Indicators of unacceptable biophysical impacts can include large areas of denuded vegetation, eroded trails and streambanks, ruts channeling water in wetlands, tracks off trails or roads through alpine areas, and/or modified wildlife behavior and habitat (as described in FW-STND-REC-08). Water quality degradation from unmanaged sanitation issues (e.g., trash accumulation and human waste) is also a clear indicator of unacceptable biophysical impacts with associated social impacts. Many of these indicators of unacceptable biophysical impacts can also be measured using the National Minimum Recreation Site Monitoring Protocol typically used for monitoring overnight use sites (FW-STND-REC-08).
- Other considerations that may inform dispersed day-use management could include concerns voiced from local communities, partners, and/or user groups.

**FW-STND-REC-09:** All unmanned aircraft systems, also known as drones, flown from National Forest System lands must comply with laws, regulations, and policies of the Federal Aviation Administration, the State of Colorado, including Colorado Parks and Wildlife, and the U.S. Forest Service. In accordance with Federal law, public recreational use, including launching, landing, and operating of unmanned aircraft systems, shall be prohibited within Management Area 1.1 (Congressionally Designated Wilderness). Specific to the GMUG, public recreational use, including launching, landing, and operating of unmanned aircraft systems, shall be prohibited within Management Areas 1.2 (Recommended Wilderness) and 4.1 (Mountain Resorts), and developed recreation sites. **Exception:** The forest may authorize, via special use permit, recreational operation of unmanned aircraft systems within developed recreation sites and Management Area 4.1 (Mountain Resorts) if all permit requirements ensure compliance with the existing legal framework at the time of the special use authorization. *See “Recreation Management Approaches” section below for more information on responsible recreational use of unmanned aircraft systems on National Forest System lands and links to regulations and guidelines of other authorities and agencies, such as the Federal Aviation Administration.*

**FW-STND-REC-10:** Non-designated dispersed camping shall be prohibited within one-quarter mile of developed campgrounds. If deemed necessary due to social impacts and/or resource degradation, dispersed camping shall also be prohibited at any designated day-use site. Note campsites may be designated (“designated dispersed”) by the national forests for overnight use within one-quarter mile of a developed campground. *See also Forestwide standards REC-07 and REC-08.*

**FW-STND-REC-11:** Fuelwood gathering above treeline shall be prohibited. Campfires above treeline shall be prohibited unless it is contained in fire pans or comparable equipment. *For campfires in wilderness, see MA-STND-WLDN-06.*

## Guidelines

**FW-GDL-REC-12:** To reduce the impacts of motorized and mechanized activities, prohibit motorized and mechanized travel outside of designated system routes and areas. Exemptions are allowed for administrative, emergency, law enforcement, wildlife habitat improvement and vegetation management activities.

**FW-GDL-REC-13:** To mitigate cumulative ecological and social impacts associated with human waste, the Forest Service should require visitors to use self-contained waste solutions on a site-specific basis (e.g., WAG bags, portable toilets) when pertinent indicators for action in Forestwide standards REC-07 and REC-08 are identified.

**FW-GDL-REC-14:** To support public safety, prevent wildlife habituation, and minimize encounters between wildlife and humans, the Forest Service should require overnight visitors to use bear-

resistant containers (certified through the Interagency Grizzly Bear Committee) for food and refuse storage when and where necessary. Bear-resistant containers can include vaults, lockers, bins, canisters, drums, boxes, bags, panniers, and coolers. Available products can be viewed on the latest certified [bear-resistant products](#) list.

**FW-GDL-REC-15:** To support equitable recreational access for the general public while also promoting a diverse range of recreational opportunities, options to manage recreation events may be implemented, when needed, such as adjustments to the number, type, group size, duration, and/or timing of recreation events. The standard REC-07 will be applied to determine when thresholds have been reached and more active management is needed. Consideration should be given, but not limited, to the following aspects: (a) existing permittee compliance, (b) demand, (c) amount of displacement of the general visiting public, (d) consistency with desired recreation opportunity spectrum (ROS) settings, (e) implications to travel management decisions, (f) observed social or biophysical impacts, (g) benefits to rural economies and tourism, and (h) community interest and/or concern. *See also Recreation Management Approaches section.*

**FW-GDL-REC-16: Recreation Opportunity Settings (ROS):** To achieve and maintain an array of place-based, long-term desired recreation settings and opportunities, project-level planning (including the development of new facilities and trails), travel management planning (designation of National Forest System roads, trails, and/or areas for motorized, mechanized and other use), development of area management plans (including wilderness), and all national forest management decisions and activities (e.g., range, timber, vegetation, wildlife, minerals, and lands) should be consistent with the desired recreation opportunity spectrum (ROS) setting parameters detailed in table 9 through table 16 and corresponding desired summer and winter recreation opportunity spectrum maps. *See Recreation Management Approaches section for implementation. See also plan appendix 1 for maps.*

Note that recreation opportunity spectrum subclasses for congressionally designated wilderness carry forward 1983 forest plan direction for areas the 1983 plan classified as Wilderness Management Areas 8A, 8B, and 8C. The revised plan direction for congressionally designated wilderness is one management area (Management Area 1.1) with assigned wilderness recreation opportunity spectrum subclasses to distinguish management direction within designated wilderness (Pristine, Primitive, and Semi-Primitive Wilderness). *See also associated guideline FW-GDL-WLDN-10.*

Prescriptions for each of the desired summer and winter recreation opportunity spectrum settings, including the corresponding over-snow vehicle suitability determinations, are provided in the following tables:

- GMUG congressionally designated wilderness recreation opportunity subclasses:
  - Pristine wilderness – (table 9)
  - Primitive wilderness – (table 10)
  - Semi-primitive wilderness – (table 11)
- GMUG Other recreation opportunity spectrum classes:
  - Primitive – (table 12)
  - Semi-primitive non-motorized – (Table 13)
  - Semi-primitive motorized – (table 14)
  - Roaded natural – (table 15)
  - Rural – (table 16)

**Table 9. Pristine wilderness recreation opportunity spectrum (ROS) subclass prescription**

[PAOT, Persons at one time]

ROS Setting: Pristine Wilderness	Summer Characteristics	Winter Characteristics
Physical	Theme: unmodified, naturally evolving, vast, and remote	
	Remoteness: 3 miles or more from designated motorized routes and areas	
	Size: 5,000 or more acres	
	<p><b>Infrastructure (access and facilities)</b>  <b>Access -</b>  Access is only via cross-country travel on foot and horse. Minimal evidence of user-created mountaineering routes may be present in some locations; no motorized travel; no mechanized travel.  <b>Recreation sites –</b>  Typically development scale 0, no improvements.</p> <p>Prohibit open fires in alpine, krummholz, meadow areas and within riparian areas when:</p> <ol style="list-style-type: none"> <li>Use of dead and down wood for fuel is likely to violate diversity requirements, soil nutrient and erosion protection, or</li> <li>Visual resource objectives for the area likely could not be met.</li> </ol> <p>Prohibit open fires when occurrence if fire-rings exceed Frissell class 1 site (or a comparable rating using more modern site inventory methodologies) conditions on 10 percent or more of the known campsites within the management area.</p> <p><b>Sanitation –</b> no facilities; leave no trace.  <b>Water supply –</b> undeveloped, natural.  <b>Signing –</b> none.  <b>Interpretation -</b> through self-discovery, guidance.  <b>Water crossing –</b> none</p>	<p><b>Public Access –</b></p> <p>Not suitable for motorized over-snow vehicles, mechanized travel, or trail grooming.</p> <p>No evidence of winter trails. Access is only via cross-country travel on non-motorized and non-mechanized transportation.</p> <p>No other infrastructure or facilities present.</p>
	Vegetation: Natural, no treatments.	
	Scenic Integrity: Very high.	

ROS Setting: Pristine Wilderness	Summer Characteristics	Winter Characteristics
Managerial	<p>All resource management activities are integrated in such a way that evidence of current human use, including permitted and recreation livestock, is not noticeable the following season, or so that natural biological processes are not adversely or artificially changed over time by human use. Design and implement management activities to maintain a pristine ecosystem. No on-site regimentation, extremely infrequent encounters with Forest Service personnel or partners and volunteers working on behalf of the agency. Visitor use management is largely off-site and accomplished through regulation, permitting, and other visitor use management techniques. Management emphasis is for the protection and perpetuation of essentially pristine bio-physical conditions and a very high degree of solitude with no perceptible evidence of human use.</p> <p>Restore soil disturbances caused by human use (e.g., past mining, grazing, trail construction and use, and camping) to soil loss tolerance levels commensurate with the natural ecological processes for the treatment area.</p> <p>Manage human activity so that wildlife and plant species population dynamics and distribution occurs naturally.</p> <p>Prohibit fish stocking except for reintroduction of indigenous species or where stocking has been previously authorized and practiced.</p> <p>Follow established utilization standards for areas, within grazing allotments. Limit utilization of forage to not more than 30 percent of current annual growth outside established allotments. Limit trampling of forage to not more than 40 percent of current annual herbaceous vegetation growth, outside established allotments.</p> <p>Manage outfitter-guide operations in the same manner as other visitors. Permit camping only in sites specified in outfitter-guide permits. Keep outfitter-guide activities harmonious with activities of non-guided visitors. Include outfitter-guide operations in calculations of level of use capacities.</p> <p>Prohibit manmade structures and facilities.</p>	

ROS Setting: Pristine Wilderness	Summer Characteristics	Winter Characteristics
Social	<p>Provide opportunities for primitive and unconfined recreation featuring solitude and to travel cross-country in an environment where success or failure is directly dependent on ability, knowledge, and initiative. Emphasize recreation opportunities on the most primitive end of the recreation opportunity spectrum. Manage use to provide very infrequent contact with other groups or individuals.</p> <p>Very high probability of solitude, closeness to nature, and self-reliance. Very high elements of challenge and risk. Very minimal to no encounters with other parties due to lack of routes or campsites.</p> <p>Maximum use and capacity levels are:</p> <ul style="list-style-type: none"> <li>• Trail and camp encounters during peak use days are less than two other parties per day.</li> </ul> <p>Trail and area-wide use capacity:</p> <ul style="list-style-type: none"> <li>• (01) Open lands, meadow and alpine 0.003 to 0.007 PAOT per acre</li> <li>• (02) Forested lands and shrub lands 0.003 to 0.007 PAOT per acre</li> <li>• Reduce the above use levels where unacceptable changes to the biophysical resources are likely to occur.</li> <li>• Do not construct or reconstruct trails.</li> </ul> <p>Limit specially permitted parties to not more than one per 2,500 acres.</p>	

**Table 10. Primitive wilderness recreation opportunity spectrum (ROS) subclass prescription**

[PAOT, Persons at one time]

ROS Setting: Primitive Wilderness	Summer Characteristics	Winter Characteristics
Physical	Theme: unmodified, naturally evolving, vast, and remote	
	Remoteness: Typically ½ mile or more from designated routes	
	Size: 5,000 or more acres	
	<p><b>Infrastructure (access and facilities)</b></p> <p><b>Access -</b> Trail density will be less than one mile per square mile. Trails are constructed and maintained for established capacity levels. Construct bridges to only the standards necessary to accommodate the specified class of user. Construct bridges only where no safe opportunity exists to cross a stream of gorge during periods of normal stream flow. Use corduroy and/or puncheon treads across bogs where no safe and feasible bypass opportunity exists. Close or sign system when not maintained to the safe standard for the specified use.travel.</p> <p><b>Recreation sites –</b> Use a minimum site spacing of 500 feet. Prohibit open fires in alpine, krummholz, meadow areas and within riparian areas when: a. Use of dead and down wood for fuel is likely to violate diversity requirements, soil nutrient and erosion protection, or b. Visual resource objectives for the area likely could not be met Typically development scale 0, no improvements.</p> <p><b>Sanitation –</b> no facilities; leave no trace.</p> <p><b>Water supply –</b> undeveloped, natural.</p> <p><b>Signing –</b> Provide signs at trail terminals and trail junctions only. Include only trail identification and identification of terminal points. Use signs of unstained wood with routed letters and mounted on unstained posts.</p> <p><b>Interpretation -</b> through self-discovery, guidance.</p> <p><b>Water crossing –</b> none</p>	<p><b>Public Access –</b></p> <p>Not suitable for motorized over-snow vehicles, mechanized travel, or trail grooming.</p> <p>Minimal evidence of user-created ski, snowshoe, and/or mountaineering routes may be present in some locations.</p> <p>No other infrastructure or facilities present.</p>
	Vegetation: Natural, no treatments.	
	Scenic Integrity: Very high.	

ROS Setting: Primitive Wilderness	Summer Characteristics	Winter Characteristics
Managerial	<p>Management emphasis is to provide for the protection and perpetuation of natural biophysical conditions. On-site regulation of recreation use is minimal. Travel is cross-country or by use of a low-density constructed trail system.</p> <p>Manage use to provide a low incidence of contact with other groups or individuals and to prevent unacceptable changes to the biophysical resources.</p> <p>Manage sites to provide opportunity for moderate to high degree of solitude.</p> <p>Manage surface occupancy activities authorized prior to wilderness designation to reduce impact on wilderness values consistent with the intent of the occupancy authorization. Restore soil disturbances caused by human use (e.g., past mining, grazing, trail construction and use, and camping) to soil loss tolerance levels commensurate with the natural ecological processes for the treatment area.</p> <p>Prohibit construction of new administrative facilities or structures. In the event a substantial portion of the existing administrative facility or structure is destroyed, it will not be replaced.</p>	
Social	<p>Emphasize primitive recreation opportunities requiring a high degree of isolation, solitude, self-reliance, and challenge while traveling cross-country or on system trails. Maximum use and capacity levels are:</p> <p>Trail and camp encounters during peak use days are less than six other parties per day.</p> <p>Trail and area-wide use capacity guidelines:</p> <p>Open Lands:</p> <ul style="list-style-type: none"> <li>▪ Alpine, Krummholz: 0.002 PAOT per acre</li> <li>▪ Rock, Mountain Grass: 0.005 PAOT per acre</li> </ul> <p>Forest and Shrub Lands</p> <ul style="list-style-type: none"> <li>▪ Ponderosa Pine, Douglas-fir, Riparian areas, White Pine: 0.01 PAOT per acre</li> <li>▪ Spruce-fir, Lodgepole Pine, Aspen: 0.02 PAOT per acre</li> </ul> <p>Occupied site guidelines:</p> <ul style="list-style-type: none"> <li>• Maximum number of sites occupied at one time: <ul style="list-style-type: none"> <li>▪ Lakes &lt;5 acres: 2; 5-25 acres: 3; &gt;25 acres: 4 Depending on site suitability/availability</li> <li>▪ Streams and Trails Open areas: 2 sites/mile</li> <li>▪ Forested areas: 4 sites/mile</li> </ul> </li> </ul> <p>Reduce visitor use when the level of use exceeds the capacity on more than 10 percent of the days during summer and fall use season.</p> <p>Manage outfitter-guide operations in the same manner as other visitors. Permit camping only in sites specified in outfitter guide permits. Keep outfitter-guide activities harmonious with activities of non-guided visitors. Include outfitter-guide operations in calculations of level-of-use capacities.</p> <p>Provide Frissell condition classes 1 and 2 campsites only (or a comparable rating using more modern site inventory methodologies).</p>	

**Table 11. Semi-primitive wilderness recreation opportunity spectrum (ROS) subclass prescription**

[PAOT, Persons at one time]

ROS Setting: Semi-Primitive Wilderness	Summer Characteristics	Winter Characteristics
Physical	Theme: some modifications that often pre-date designation, naturally evolving with prior influences, centered near trailheads and destinations such as 14ers with higher visitation levels than other wilderness, and often more developed trails or even old roadbeds (e.g. old mining roads) for trails.	
	Remoteness: Not Applicable	
	Size: Not Applicable	
	<p><b>Infrastructure (access and facilities)</b>  <b>Access –</b>  Trail density will not exceed two miles per square mile. Trails are constructed and maintained for moderate to high levels of use as specified below. Construct bridges to only the standards necessary to accommodate the specified class of user. Construct bridges only where no safe opportunity exists to cross a stream of gorge during periods of normal stream flow.</p> <p>Use corduroy and/or puncheon treads across bogs where no safe and feasible bypass opportunity exists.</p> <p>Close or sign system trails when not maintained to the safe standards for the specified use. no mechanized travel.</p> <p><b>Recreation sites –</b>  Typically development scale 0, no improvements.</p> <p><b>Sanitation –</b> no facilities; leave no trace.</p> <p><b>Water supply –</b> undeveloped, natural.</p> <p><b>Signing –</b> Provide signs at trail terminals and trail junctions only. Include only trail identification and identification of terminal points. Use signs of unstained wood with routed letters and mounted on unstained posts.</p> <p><b>Interpretation –</b> through self-discovery, guidance.</p> <p><b>Water crossing –</b> none</p>	<p><b>Public Access –</b>  Not suitable for motorized over-snow vehicles, mechanized travel, or trail grooming.</p> <p>Regularly used ski, snowshoe, and/or mountaineering routes may be present.</p> <p>No other infrastructure or facilities present.</p>
	Vegetation: Natural, no treatments.	
	Scenic Integrity: Very high.	



ROS Setting: Semi-Primitive Wilderness	Summer Characteristics	Winter Characteristics
Managerial	<p>Management emphasis is to provide for the protection and perpetuation of essentially natural bio-physical conditions. Solitude and a low level of encounters with other users or evidence of past use is not an essential part of the social setting. Human travel is principally on system trails. Designated campsites are used and show evidence of repeated, but acceptable levels of use.</p> <p>All resource management activities are integrated in such a way that current human use leaves only limited and site-specific evidence of their passing. Areas with evidence of unacceptable levels of past use are rehabilitated and the affected area restored. Range allotments with authorized permanent structures and authorized mineral exploration activities inquiring multi-year surface occupancy facilities may be present within the area. Scientific and other authorized practices utilizing non-motorized equipment, but requiring up to season-long occupancy, are compatible.</p> <p>Restore soil disturbance caused by human use (e.g., past mining, grazing, trail construction and use, and camping) to soil loss tolerance levels commensurate with the natural ecological processes for the treatment area.</p> <p>Prohibit construction of new administrative facilities or structures. In the event a substantial portion of the existing administrative facility or structure is destroyed, it will not be replaced.</p>	
Social	<p>Maximum use and capacity levels are: Trail and camp encounters during peak use days are less than 20 other parties per day.</p> <p>Trail and area-wide use capacity guidelines:</p> <p>Open Lands:</p> <ul style="list-style-type: none"> <li>▪ Alpine, Krummholz: 0.004 PAOT per acre</li> <li>▪ Rock, Mountain Grass: 0.008 PAOT per acre</li> </ul> <p>Forest and Shrub Lands</p> <ul style="list-style-type: none"> <li>▪ Ponderosa Pine, Douglas-fir: 0.05 PAOT per acre</li> <li>▪ Riparian areas, White Pine Spruce-fir, Lodgepole Pine, Aspen: 0.08 PAOT per acre</li> </ul> <p>Occupied site guidelines:</p> <p>Maximum number of sites occupied at one time:</p> <ul style="list-style-type: none"> <li>▪ Lakes &lt;5 acres: 2; 5-25 acres: 3; &gt;25 acres: 4</li> </ul> <p>Depending on site suitability/availability, Streams and Trails Open areas:</p> <ul style="list-style-type: none"> <li>▪ 3 sites/mile</li> <li>▪ Forested areas: 6 sites/mile</li> </ul> <p>Allow sites to be occupied 20 days summer season or to the level required to maintain at least a stable trend in site condition.</p> <p>Permit undesignated sites in Frissell condition class 1 through 3 where unrestricted camping is permitted. Manage site use and occupancy to maintain sites within Frissell condition class 3 except for designated sites which may be Class 4. Close and restore class 5 sites. Comparable ratings using more modern site inventory methodologies may be used.</p>	

**Table 12. Primitive setting prescription for the desired summer and winter recreation opportunity spectrum (ROS)**

[Excerpts for this and following tables from FSM 2300 Ch 10, Sustainable Recreation Planning.]

ROS Setting: Primitive	Summer Characteristics	Winter Characteristics
Physical	Theme: Predominantly unmodified, naturally evolving, vast, and remote	
	Remoteness: Three miles or more from designated motorized routes and areas	
	Size: 5,000 or more acres	
	<b>Infrastructure (access and facilities)</b> <b>Access</b> – non-motorized trails; typically trail class 1; Travel on foot and horse; no motorized travel; no mechanized travel within designated wilderness. <b>Recreation sites</b> – typically development scale 0, no improvements. <b>Sanitation</b> – no facilities, leave no trace. <b>Water supply</b> – undeveloped, natural. <b>Signing</b> – minimal, constructed of rustic natural materials. <b>Interpretation</b> – through self-discovery <b>Water crossing</b> – minimal, pedestrian only, made of natural materials.	<b>Public Access</b> – not suitable for motorized over-snow vehicles. User-created, non-motorized routes. No other infrastructure or facilities typically present. <b>Managerial</b> – motorized equipment such as trail groomers shall not be authorized under permit to provide non-motorized recreation opportunities.
	Vegetation: Natural, no treatments except for use of wildfire to achieve land management objectives	
	Scenic Integrity: very high.	
Managerial	Little to no on-site regimentation, few encounters with Forest Service personnel or partners and volunteers working on behalf of the agency. Visitor use management is largely off-site and accomplished through regulation, permitting, and other visitor use management techniques.	
Social	Very high probability of solitude; closeness to nature; self-reliance, high challenge, and risk; little evidence of people. Typically, six or fewer encounters with other parties on trails, and fewer than three parties visible from camping sites.	

**Table 13. Semi-primitive non-motorized setting prescription for the desired summer and winter recreation opportunity spectrum (ROS)**

ROS Setting: Semi-Primitive Non-Motorized	Summer Characteristics	Winter Characteristics
Physical	Theme: Predominantly natural and/or natural appearing; rustic improvements to protect resources.	
	Remoteness: One-half mile or more from designated motorized routes and areas.	
	Size: 2,500 or more acres	
	<b>Infrastructure (access and facilities)</b> <b>Access</b> – non-motorized routes; trail classes 1-2 typical. Foot, horse and/or mountain bike use - no motorized travel. Closed and temporary roads may be present. Warming huts, cabins and / or rustic facilities may be present. <b>Recreation sites</b> – typically development scale 0-1, sometimes development scale 2. Minor investments to protect natural and cultural resources. <b>Sanitation</b> – no facilities, leave no trace <b>Water supply</b> – undeveloped, natural <b>Signing</b> – rustic, natural materials. <b>Interpretation</b> – typically self-discovery <b>Water crossing</b> – rustic structures for foot, horse and/or bicycle traffic.	<b>Public Access</b> – not suitable for motorized over-snow vehicles.  Non-motorized trails with some trail markers, user-created routes and areas for non-motorized use. Groomed ski (non-motorized) trails may also exist. Few, if any, facilities or services available, but warming huts, cabins and / or rustic facilities may be present.  <b>Managerial</b> – motorized equipment such as trail groomers may be authorized under permit to provide non-motorized recreation opportunities. No other infrastructure or facilities typically available.
	Vegetation: Treatments enhance forest health and mimic natural vegetation patterns.	
	Scenic Integrity: Typically High	
Managerial	Minimum or subtle signing, regulations, or other on-site regimentation. Low encounters with Forest Service personnel or partners and volunteers working on behalf of the agency.	
Social	High probability of solitude, closeness to nature, self-reliance. High to moderate challenge and risk. Typically 6-15 encounters with other parties on trails. Six or fewer parties visible from camping sites.	

**Table 14. Semi-primitive motorized setting prescription for the desired summer and winter recreation opportunity spectrum (ROS)**

ROS Setting: Semi-Primitive Motorized	Summer Characteristics	Winter Characteristics
Physical	Theme: Predominantly natural-appearing, motorized use visible and audible.	
	Remoteness: One-half mile or more from maintenance level 3-5 roads but containing maintenance level 2 roads and motorized trails and/or designated motorized areas	One-half mile or more from plowed road.
	Size: 2,500 or more acres	
	<b>Infrastructure (access and facilities)</b>  <b>Access</b> – motorized routes: maintenance level 2 roads and trail class 2 typical; Off-highway vehicles allowed on designated routes and areas. Warming huts, cabins and / or rustic facilities may be present. <b>Recreation sites</b> – typically development scales 0-2; Purpose of investments (infrastructure) is to protect natural and cultural resources. <b>Sanitation</b> – limited facilities, outhouses may be in areas of concentrated use. <b>Water supply</b> – undeveloped natural <b>Signing</b> – rustic, made of natural materials <b>Interpretation</b> – self-discovery, located off-site or at trailheads; <b>Water crossing</b> – rustic structures or bridges.	<b>Public Access</b> – suitable for travel by motorized over-snow vehicles  Ungroomed, marked over-snow vehicle routes and areas. Ungroomed ski trails. Over-snow vehicle use on designated routes/areas. Groomed ski (non-motorized) and motorized trails may also exist.  Few, if any, facilities or services available, but warming huts, cabins and / or rustic facilities may be present.  <b>Managerial</b> – motorized equipment such as trail groomers may be authorized under permit to provide both motorized and non-motorized recreation opportunities.
	Vegetation: treatments improve forest health and mimic natural vegetation patterns.	
	Scenic Integrity: Typically high to moderate.	
Managerial	Minimum, subtle on-site controls; designated motorized routes/areas.	Minimum, subtle on-site controls; designated routes and areas for over-snow vehicles.
Social	Moderate to high probability of solitude. High to moderate degree of risk/challenge. Typically 6-15 encounters with other parties on trails. Six or fewer parties visible from camping sites.	

**Table 15. Roaded natural setting prescription for the desired summer and winter recreation opportunity spectrum (ROS)**

ROS Setting: Roaded Natural	Summer Characteristics	Winter Characteristics
Physical	Theme: Natural appearing with nodes and corridors of development such as campgrounds, trailheads, boat launches, and rustic, small-scale resorts.	
	Remoteness: Within one-half mile of maintenance level 3-5 roads. Maintenance level 2 roads may also be present.	
	Size: N/A	
	<b>Infrastructure (access and facilities):</b>  <b>Access</b> – Typically: maintenance level 3-5 roads. Maintenance level 2 roads may also be present. Typically trail classes 3-4, Highway vehicles, off-highway vehicles, and other motorized travel on designated routes. <b>Recreation sites</b> – Typically development scales 0-3, sometimes development scale 4. <b>Sanitation</b> – typically vault toilets <b>Water supply</b> – often developed <b>Signing</b> – variety of materials, blend with natural setting. <b>Interpretation</b> – simple roadside signs, some interpretive displays. <b>Water crossings</b> – bridges, natural materials	<b>Public Access</b> – Suitable for travel by motorized over-snow vehicles. Some plowed roads and groomed over-snow vehicle routes. Groomed ski trails may also exist.  Warming huts, cabins, and rustic facilities may be present.
	Vegetation: Vegetation treatments are evident but in harmony with the scenic character.	
	Scenic Integrity: Ranges from high to low. Note that low scenic integrity is typically in highly manipulated settings where the evidence of mining, extensive timber harvest, or other management activities that are dominant on the landscape.	
Managerial	Signs and regulations present but typically subordinate to the setting. Moderate likelihood of encountering Forest Service personnel or volunteers/partners working on behalf of the agency.	
Social	Moderate evidence of human sights and sounds; moderate concentration of users at developed recreation sites; little challenge or risk is expected in these outdoor settings due to nearby amenities and management controls ( <i>see above physical and managerial characteristics</i> ). Opportunities to socialize.	

**Table 16. Rural setting prescription for the desired summer and winter recreation opportunity spectrum (ROS)**

ROS Setting: Rural	Summer Characteristics	Winter Characteristics
Physical	Theme: Altered landscapes with cultural emphasis such as: rural, pastoral, and/or agricultural. Administrative sites, historic complexes, and moderately developed resorts such as local ski areas, are typical.	
	Remoteness: Not remote, often near other (non-Forest Service) rural settings and communities.	
	Size: N/A but typically small parcels within larger roaded natural settings.	
	<b>Infrastructure (access and facilities):</b>  <b>Access</b> – typically maintenance level 3-5 roads and trail classes 3-5, mass transit sometimes available. <b>Recreation sites</b> – typically development scale 4-5. <b>Sanitation</b> – flush toilets <b>Water supply</b> – developed, showers common <b>Signing</b> – natural and synthetic materials <b>Interpretation</b> – roadside exhibits, interpretive programs <b>Water crossings</b> – bridges that accommodate: highway vehicles, recreation vehicles and heavy equipment.	<b>Public Access</b> – Suitable for travel by motorized over-snow vehicles. Groomed over-snow vehicle routes, groomed cross-country skiing, skate skiing, and downhill ski/snowboard trails.  Over-snow vehicle use on designated routes and areas.  Full-service facilities and resorts often present.
	Vegetation: treatments often visible, blend with landscape	
	Scenic Integrity: Ranges from high to low.	
Managerial	Obvious signing (regulation and information), education and law enforcement staff. Motorized and mechanized travel common and often separated.	
Social	High interaction among users is common. Other people in constant view. Little challenge or risk associated with being outdoors.	

## Management Approaches

**FW-MA-REC-17:** Engage cooperators in stewardship activities as well as the development of sustainable recreation strategies and practices.

**FW-MA-REC-18:** Encourage innovative special uses through partnerships and other collaborative efforts.

**FW-MA-REC-19:** Improve trail systems by coordinating with municipalities, counties, states, other Federal agencies, and partners to allow for integration and connectivity. For existing trail systems, partner to better ensure funding and resources for basic maintenance, including leveraging all available resources through outfitters and guides, other permitted uses, and the general public.

**FW-MA-REC-20:** Expand public access to and education about the mining and cultural history of the national forests through programs such as cabin rentals and interpretation when possible.

**FW-MA-REC-21:** To facilitate ample dissemination of user-friendly information and education about recreating in the GMUG, provide consistently updated visitor information in a variety of formats and forums. Examples include physical hard copies, digital medium, web-based content, media, and outreach with the help of a variety of partners. Information should encourage visitors to recreate in a variety of settings throughout the national forests, not just in currently popular or concentrated areas.

**FW-MA-REC-22:** Provide readily available offsite and onsite information about recreation opportunities at fee campgrounds.

**FW-MA-REC-23:** To increase stewardship of public lands and promote responsible recreation, encourage Forest Service staff and national forest visitors to embrace and implement outdoor ethic and trail etiquette principles such as those found in Leave No Trace, Stay the Trail, and Tread Lightly! programs, as well as right-of-way information for trail users.

**FW-MA-REC-24:** To curtail resource damage arising from the creation of unauthorized trails and use within sensitive areas (e.g., riparian or high alpine), encourage use of National Forest System trails instead by improving existing National Forest System trails (maintenance attention, signage, or rerouting) in these areas and/or strategically placing natural barriers on unauthorized trails.

**FW-MA-REC-25:** When addressing social and/or biophysical impacts related to dispersed recreation use (FW-STND-REC-07, FW-STND-REC-08, MA-OBJ-EMREC-02, MA-OBJ-EMREC-03), the basic criteria for selecting the most appropriate management action(s) from a diverse range of options is *what will efficiently and effectively respond to observable impacts*. When and where possible, consider phasing management actions by first selecting a less obtrusive approach (such as stewardship education) and observing visitor behavior over a specific timeframe before implementing restrictions or developing extensive infrastructure; however, phasing is not always the most appropriate approach.

- Whenever possible, select a responsive management action that will decrease the dispersed site's overall impact rating below 6. If hardening or stabilization actions are selected that would result in a continued overall impact rating above 6, or graduate the site to above a 2 on the recreation site development scale (detailed in FSH 2309.13, 10.8), the site would then become a developed recreation site as opposed to dispersed.
- Additionally, sometimes an intentional decision to select no management action in reaction to observed impacts might be the most feasible course of action. In instances when this is the case, the decision and rationale to not act should be documented.

- As part of addressing currently observed impacts, seek to implement proactive measures to offset the chance of similar impacts in other locations.

**FW-MA-REC-26:** Desired recreation opportunity spectrum (ROS) settings function as a framework for (1) meeting the persisting and evolving needs of diverse user groups (FW-DC-REC-01) and, (2) ensuring that recreation is appropriately prioritized and balanced with other national forest resources over time (MA-DC-EMREC-01 and FW-DC-REC-02). Mapped at the national forest-scale, desired recreation opportunity spectrum settings provide desired landscape-level settings to work toward and/or maintain over the life of the forest plan. However, should finer-scale analysis, public feedback, and/or place-based needs lead to a decision that is substantially or irreversibly inconsistent with the Forestwide mapped desired recreation opportunity spectrum setting allocations (e.g., installation of permanent infrastructure such as a non-conforming trail class cutting through the middle of a desired recreation opportunity spectrum setting), the following will be done as part of that planning effort: (a) the inconsistency and rationale for deviation is documented, and, if changes are spatial, (b) the desired recreation opportunity spectrum (ROS) map(s) is/are amended. The responsible official will determine whether the scale of inconsistency is of such magnitude to require a plan amendment or an administrative map change due to mapping alterations.

**FW-MA-REC-27:** Promote education regarding responsible recreational use of drones unmanned aircraft systems to support compliance with all Federal Aviation Administration regulations and guidance. [Tips for responsible recreational use of unmanned aircraft systems on National Forest System lands](#) are available online. Coordinate with Colorado Parks and Wildlife to enforce CPW's regulations regarding wildlife harassment from drones; the GMUG has authority to enforce CPW regulations per 36 CFR 261.8.

**FW-MA-REC-28:** Work to develop a plan for sustainable management of recreation event special use permits for each ranger district. Potential tools could include establishing a lottery system, instituting a cap, or adopting a process for controlling and reassessing the acceptable availability on a yearly or seasonal basis (e.g., limited to a specific number of use days per district, per use season).

**FW-MA-REC-29:** Support education regarding responsible, permitted public use of trail cameras on National Forest System lands. For authorized cameras installed for the purposes of resource management or research, where possible, provide brief information to accompany each camera placement regarding the intended purpose, timeframe of use, anticipated outcomes, and/or how interested people can learn more.

**FW-MA-REC-30:** For the purposes of future travel management planning for over-snow motorized vehicle use, work to develop a method for identifying adequate snow depths to avoid or minimize damage to natural and cultural resources from snow machine use.

## ***Trails (TRLS)***

*The following direction applies to all system trails on the GMUG. For Congressionally and Administratively Designated Trails, see the section "Designated Trails" above. See also all direction (and cross-references) in the Infrastructure section and especially the Forestwide objective to reduce duplicative routes within Gunnison sage-grouse habitat, SPEC-38.*

## ***Desired Conditions***

- **FW-DC-TRLS-01:** A sustainable, diverse trail system is in place and maintained at least to the minimum standards appropriate for safe public access. National Forest System trails support multiple recreation use types that contribute to social and economic viability in the plan area, and connect established towns and developed recreation sites to the surrounding landscape. National



Forest System trails are designed and maintained in a manner that ensures resource protection and facilitates positive visitor experiences. National Forest System trails accommodate a variety of use types across a variety of terrain designed for a variety of skill levels. New trail development is concentrated in areas close to communities where open road and trail densities, and human activities, are already high (e.g., MA 4.2 – EMREC). Development of stacked, looped, and/or stacked-loop trails are considered in appropriate areas and circumstances. National Forest System trails are clearly marked, particularly where routes cross ownership and jurisdiction. Trailheads adequately accommodate the levels and types of use occurring along the system within the prescribed desired recreation opportunity spectrum (ROS) settings and are adjusted based on resource needs and use demands.

### **Objectives**

- **FW-OBJ-TRLS-02:** Annually, maintain at least 500 miles of National Forest System trails, per the INFRA database definition of “maintained to standard” or other such similar standard that may be implemented by the Washington Office Trails Program. Trails are prioritized by those located in recreation emphasis areas (MA 4.2 – EMREC), by amount of use, and those where use is causing unacceptable resource damage (FW-STND-REC-08) and/or presenting hazards outside of the trail class. *See also the Forestwide desired condition for partnerships, PART-01.*
- *See also FW-OBJ-REC-06 regarding rehabilitation of unauthorized routes.*

### **Management Approaches**

**FW-MA-TRLS-03:** When managing trails and considering new trail developments, use *Colorado’s Guide to Planning Trails with Wildlife in Mind* (Colorado Trails with Wildlife in Mind Taskforce (2021)). This guide, and other best practice guides, are resources that the GMUG National Forests should use to help identify ways to contribute to sustainable recreation management and wildlife conservation.

### **Scenery (SCNY)**

*See also Why the GMUG Matters: Distinctive Roles and Contributions in the Larger Landscape.*

### **Desired Conditions**

**FW-DC-SCNY-01:** The national forests reflect a range of scenic quality sustained by a diverse and resilient landscape. High quality, natural-appearing scenery and scenic values persist in viewsheds from areas with high public use such as scenic byways and scenic travel corridors, national scenic and historic trails, national recreation trails, and developed recreation sites, with constructed elements harmonizing with natural features including vegetation, water features, landforms, and geology.

### **Objectives**

**FW-OBJ-SCNY-02:** Within 10 years of plan approval, complete three projects that improve the scenic integrity in areas that do not meet established scenic integrity objectives. Priority activities include decommissioning or rehabilitating unauthorized system roads and routes, removing unnecessary fences, restoring grasslands and aspen stands, and painting facilities, particularly within the immediate foreground of scenic byways. *See also the Forestwide desired condition for Scenic Byways, SBWY-01.*

## Guidelines

**FW-GDL-SCNY-03:** To maintain or improve scenic character over the long-term and perpetuate high-quality scenic values consistent with the GMUG's distinctive roles and contributions, all national forest management activities should be consistent with or move the area toward achieving the desired scenic integrity objectives. For example, this includes shaping and blending any even-aged regeneration cuts, as well as other harvest types and fuel treatments, to the extent practicable with the natural terrain. Scenic integrity objectives are both defined and associated to distinct management area categories and overlays in plan appendix 3, *Scenic Integrity Descriptions and Scenic Travelways*, and mapped in the scenic integrity objective map. *For maps, see plan appendix 1.*

**FW-GDL-SCNY-04:** To maintain scenic character and meet desired scenic integrity objectives, new or reconstructed features and facilities should:

- Be clustered within existing areas,
- Be consistent with the built environment image guide, and
- Use colors and materials that blend with the natural-appearing landscape.
- If a new or reconstructed facility cannot be made consistent with the desired scenic character of a given location, it should be blended or screened with landscape and/or architectural techniques.
- Developed recreation facilities and improvements should be complimentary with the surrounding scenic character and associated development scale. Sites with moderate or low desired scenic integrity objectives should be in harmony with the desired recreation opportunity spectrum setting (ROS) and associated development scale as well as consistent with the scenic integrity objective.

**FW-GDL-SCNY-05:** To maintain scenic character for the scenic byways, travel corridors, trails, and streams that make up the set of concern level 1 travelways, vegetation should be managed within 300 feet of the travelway to retain or enhance the scenic quality of the immediate foreground of the travelway, unless such measures would directly conflict with maintenance standards for such infrastructure (e.g., reduction of hazardous fuels along a power line that immediately bisects the route). *See plan appendix 3 for full list of concern level 1 travelways.*

**FW-GDL-SCNY-06:** To maintain scenic character for scenic byways, travel corridors, scenic trails, and streams that comprise the set of concern level 1 travelways, the development of large facilities (including, but not limited to, powerlines, gas wells, and power stations) should be avoided within the immediate foreground of the route (300 feet), unless the proposed infrastructure can be effectively screened (e.g., with vegetation and topography). **Exception:** Where concern level 1 travelways intersect the utility corridor overlay or other established rights-of-way, or for any recreation infrastructure proposed along any concern level 1 travelway, facilities can be located within this buffer, but they should be blended to the extent possible and be consistent with the established scenic integrity objective for the area.

## Management Approaches

**FW-MA-SCNY-07:** Provide the scenery management inventory and scenic integrity objective maps to neighboring land management agencies for cross-boundary integration into projects and plans.

**FW-MA-SCNY-08:** Prioritize scenic integrity rehabilitation considering the following:

- Foreground (within 300 feet to 0.5 mile) of high public use areas has the highest priority,

- Amount of deviation from the desired scenic integrity objectives (where existing scenic integrity is lower than the mapped revised plan desired scenic integrity objective),
- Length of time it would take natural processes to reduce the visual impacts so that they meet the scenic integrity objectives,
- Length of time it would take rehabilitation measures to meet the scenic integrity objectives, and
- Benefits to other resources.

**FW-MA-SCNY-09:** For more publicly visible projects with short-term scenery impacts, consider displaying interpretive or informational signs to inform the public to improve understanding (e.g., short-term impacts of an aspen regeneration project intended to improve both long-term stand resilience and scenic integrity).

## Scenic Byways (SBWY)

In the forest plan, scenic byways encompass a mapped area of about 72,900 acres (2.3 percent of the national forests) that overlies multiple other management areas.

### *Desired Conditions*

**FW-DC-SBWY-01:** The intrinsic scenic, natural, historical, cultural, archaeological, and recreational qualities for which the scenic byways were designated are maintained or improved and showcased through exhibits, signs, and programs, connecting visitors to attractive and accessible natural landscapes, and contributing to recreation tourism and local economies.

*See also the “Scenery” section, including the Forestwide guideline SCNY-05, as scenic byways are concern level 1 routes and are generally managed for a high scenic integrity objective (see also plan appendix 3 for more detail).*

### *Management Approach*

**FW-MA-SBWY-02:** Collaborate with local scenic byway committees and state and national entities to update and implement byway plans.

## Timber and Other Forest Products (TMBR)

Forest management in the GMUG National Forests is motivated by desired conditions for resilient, climate-adapted ecosystems (*see desired conditions FW-DC-ECO-01, 02, 03, and FW-DC-FFM-01*). Vegetation management is designed to meet ecological restoration and climate change adaptation objectives. The vegetation management program also contributes to the viability of the timber industry in the State of Colorado, with the industry serving as an essential partner to achieve multiple forest resource objectives; *see plan chapter 1, “Distinctive Roles and Contributions.”*

Climate change adaptation projects utilize one or more strategies from the “toolbox” approach to climate change adaptation, including 1) *resistance* (forestall impacts and protect highly valued resources), 2) *resilience* (improve the capacity of ecosystems to return to desired conditions after disturbance), and 3) *transition* (facilitate transition of ecosystems to new conditions) – commonly referred to as the “RRT” approach (Millar et al. (2007), Peterson et al. (2011), and Swanston et al. (2016)). (*See detailed management approach FW-MA-CC-01 in the Climate Change and Carbon section of the plan*). Climate change adaptation, as well as forest restoration, is a driver for decision-making for vegetation management. All vegetation management incorporates one or more climate change adaptation strategies from the “toolbox” approach, and takes carbon storage, uptake, and flux

into account for both the short and long term. *See also the plan section “Climate Change and Carbon” for more background on climate adaptation approaches and associated strategies.*

Other vegetation management project objectives may include increasing ecosystem resilience to wildfire and other disturbances, restoration and improvement of watershed function, reduction of wildfire hazard to communities, and protection of critical infrastructure, particularly that which supports municipal and agricultural water supplies.

### **Desired Conditions**

Vegetation management should contribute to a variety of desired conditions such as improved watershed function, increased resiliency to climate change, and reduced wildfire potential. *See desired conditions for Social and Economic Environment FW-DC-SCEC-01; Climate Change and Carbon FW-MA-CCC-01; Key Ecosystem Characteristics FW-DC-ECO-01, 02, and 03; and Fire and Fuels DC FFM-01.*

**FW-DC-TMBR-A:** Sustainable forest product yields contribute to local economies and are sufficient to support the desired pace and scale of ecological restoration and climate adaptation over the next several decades. A sustainable mix of forest products is offered under a variety of harvest and contract methods in response to market demand, restoration objectives, and climate adaptation. *See supporting plan objectives FW-OBJ-TMBR-C, FW-OBJ-FFM-02, FW-OBJ-SPEC-03 and the projected timber sale program in appendix 2.*

**FW-DC-TMBR-B:** On lands suitable for timber production, planting environments favor seedling survival, sustainable recruitment levels, and species composition to allow for long-term resilience of the developing forest, while considering best available scientific information regarding modeled future changes in climate. Stand densities are appropriate to impart resilience to future drought stress, fire, and insect outbreaks. Species and genotypes expected to fare better in future climate conditions are promoted.

### **Suitability**

Approximately 771,000 acres of land in the GMUG National Forests have been identified as suitable for timber production. Lands are identified as suitable for timber production through the process detailed in the plan appendix 8. Even though lands may be identified as suitable for timber production, those lands are not guaranteed to be feasible for harvest. Feasibility is determined at the site-specific, project level with more detailed information. On lands not suited for timber production, vegetation management may still be conducted to, e.g., complete restoration and climate adaptation projects and complete mechanical fuels reduction to mitigate wildfire risk in the wildland-urban interface and municipal watersheds and protect other values at risk from wildfire. *The determination of suitability is required by law and policy; see 36 CFR 219.11(a).*

### **Objectives**

**FW-OBJ-TMBR-C:** Within one year, build and continue to update a centralized and comprehensive GIS dataset of temporary roads and their status across the GMUG as 1) legacy temporary roads are identified, closed, and/or decommissioned or 2) current temporary roads are approved in a timber sale contract, and then closed and/or decommissioned. Mapped locations of existing and past temporary roads can inform contemporary timber sale layouts for potentially more efficient sales.

**FW-TMBR-OBJ-D:** Annually, offer timber sale volume to support desired conditions for ecological and economic sustainability. *See the Projected Timber Sale Program in Appendix 2 to inform implementation of the timber program.*

## Standards

**FW-STND-TMBR-01:** The maximum size limit of openings created by even-aged management in one harvest operation shall be 40 acres, regardless of forest type, with the following exceptions:

- proposals for larger openings have been approved by the regional forester after a 60-day public review and are determined to be consistent with other plan components; or
- even-aged management in aspen and lodgepole-pine-dominated ecosystems may be larger, to better mimic naturally larger openings created by natural disturbances in these ecosystems, with a maximum size limit of openings created by even-aged management of 100 acres; or
- areas managed as a result of natural and climate change-exacerbated catastrophic conditions (including those resulting from fire, insects, diseases, and windstorms).

*This standard is required by law and policy; see 36 CFR 219.11(d)(4)(i)-(iii).*

**FW-STND-TMBR-02:** Timber harvest shall be conducted to ensure that the technology and knowledge exist to minimally restock areas suitable for timber production with tree seedlings within 5 years after final harvest. Minimum restocking levels for areas suitable for timber production are defined in table 17. **Exception:** Exceptions to these minimum levels are allowed if supported by a project-specific determination of adequate restocking, e.g., when stands are treated to reduce fuel loadings, to create openings for scenic vistas, to transition a site to an ecosystem better adapted to future climates, to support research experiments, or to remove encroaching trees to meet desired wildlife habitat conditions. Restocking levels for areas unsuitable for timber production must be specified with the silvicultural prescription. Project-specific determination of minimum stocking must be consistent with all other applicable plan components. *This standard is required by law and policy; see (36 CFR 219.11(d)(5)).*

**Table 17. Minimum restocking level for areas suitable for timber production, by cover type**

[Sources consulted include the 2003 Wasatch Cache Revised Forest Plan, pp. 106, and the Rio Grande Final Forest Plan pp. 35, with numbers updated for relevance in the GMUG per professional silvicultural expertise (e.g., removing pure Douglas-fir, including ponderosa pine, and reducing the density of mixed conifer to 100).]

Species	Minimum Stocking (seedlings/acre)	Area Meeting Minimum Stocking (acres)
Lodgepole pine	150	70
Warm-dry mixed conifer	100	70
Cool-moist mixed conifer	150	70
Spruce-fir	150	70
Aspen	300	70
Ponderosa pine	100	70

**FW-STND-TMBR-03:** Timber shall not be harvested for the purpose of timber production on lands not suited for timber production (36 CFR 219.11(d)(1)). Timber harvest may occur on these lands as a tool to assist in achieving or maintaining one or more applicable desired conditions or objectives of the plan to protect other multiple-use values and for salvage, sanitation, public health, or safety. *This standard is required by law and policy; see 36 CFR 219.11(c).* Examples of using timber harvest as a tool to protect other multiple use values include, but are not limited to, ecological restoration, climate change adaptation, restoring meadows or savanna ecosystems, improving wildlife or fish habitat, and

thinning to reduce fire risk. *See plan appendix 8, Timber Suitability Analysis, and the Climate Change and Carbon section of the plan, for adaptive management approaches to climate change adaptation through vegetation management.*

**FW-STND-TMBR-04:** Timber shall not be harvested on lands where soil, slope, or other watershed conditions including groundwater-dependent ecosystems, such as fens and other wetlands, may be irreversibly damaged, as identified in project-specific findings (36 CFR 219.11(d)(2)). *See also FW-GDL-SOIL-04.*

**FW-STND-TMBR-05:** Silvicultural systems shall be selected to achieve desired conditions and objectives or to meet site-specific project needs, not primarily for the greatest dollar return or timber output. *This standard is required by law and policy; see 36 CFR 219.11(d)(5).*

**FW-STND-TMBR-06:** The quantity of timber that may be sold per decade will be less than or equal to the sustained yield limit of 1,276,200 CCF per decade with the following exceptions: 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. These exceptions may be harvested over and above the sustained yield limit. *See 36 CFR 219.11(d)(6)) and plan appendix 8, Timber Suitability Analysis.*

**FW-STND-TMBR-07:** Clearcutting shall only be used where it has been determined by the responsible official in the project record to be the optimum method. Other types of even-aged harvest shall only be used where determined by the responsible official in the project record to be appropriate. Determinations shall follow interdisciplinary review and be based on site-specific conditions and the forest plan's desired conditions for vegetation, wildlife habitat, scenery, and other resources. *This standard is required by law and policy; see 36 CFR 219.11(d)(5).*

**FW-STND-TMBR-07.a:** To achieve optimal volume production and maintain ecosystem integrity, regeneration harvests of even-aged timber stands on GMUG lands identified as suitable for timber production and where timber production is the primary purpose for the harvest shall generally not be undertaken until the stands have reached or surpassed 95 percent of the culmination of the mean annual increment measured in cubic feet. *This standard is required by law and policy; see 36 CFR 219.11(d)(7).* Exceptions may be made where resource management objectives or special resource considerations require earlier harvest, such as, but not limited to:

- salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow or other catastrophe, or which are in imminent danger from insect or disease
- wildlife habitat improvement,
- ecosystem restoration, or
- fuels reduction.

This limitation does not apply to thinning or other stand improvement treatments and uneven-aged systems that do not regenerate even-aged stands.

*See also the Forestwide standards especially pertinent to timber management: standards SPEC-55 and 57 regarding restrictions in conservation watershed networks, SOIL-02 regarding maximum soil disturbance, and WTR-05, as well as direction for vegetation management in riparian management zones (RMGD).*

*See also management area direction for recreation emphasis areas, EMREC-01 and 07, regarding the role of timber activity in these locations.*

## Guidelines

**FW-GDL-TMBR-07.b:** To ensure new temporary roads are appropriately designed, optimally used, and decommissioned, the estimated amount and approximate locations of temporary roads should be identified during site-specific project analysis. Temporary roads determined to be needed beyond the initial project activity, such as for reforestation or prescribed fire application, should be considered for classification and construction as an administrative (maintenance level 1) road. To effectively comply with FW-GDL-TMBR-07.c, project-level decisions should accordingly specify the intended uses of the temporary road.

**FW-GDL-TMBR-07.c:** To minimize impacts of new temporary roads, all new temporary roads should be:

- closed and decommissioned prior to termination of the associated contract unless their use after the completion of the contract has been identified. If their use after the completion of the contract has been identified (e.g., for prescribed fire treatments), they should be:
  - closed and decommissioned by the Forest Service or other identified responsible party after completion of the planned subsequent activity.

Closure and decommissioning should re-contour where significant side slope exists, eliminate ditches and other structures, out-slope during construction, remove ruts and berms, remove culverts or other instream structures and associated fills, and effectively block the road to all motorized and mechanized access, and construct drainage features such as cross ditches and water bars as appropriate. Maximize opportunities to close and rehabilitate pre-existing temporary roads in the project area at the same time. *See also the Forestwide guideline for invasive species IVSP-06 for reseeding direction.* Exception: When interdisciplinary analysis confirms the first 300 feet of a temporary road (from a system road) would provide a sustainable setting for dispersed camping, it may be retained and designated as a dispersed camping site.

**FW-GDL-TMBR-08:** To minimize erosion, post-wildfire timber salvage should not occur in areas with high soil burn severity and not yet recovered, unless the removal of hazard trees is necessary for safety or to reduce risk to infrastructure. *See also Forestwide standard SOIL-02.*

**FW-GDL-TMBR-09:** To maintain wildlife habitat diversity, 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. 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. *See also Forestwide guideline TMBR-08.*

*See also the Forestwide guidelines especially pertinent to timber management, including SPEC-11, SPEC-55, SOIL-04 and direction for riparian management zones and groundwater-dependent ecosystems (RMGD).*

## Management Approaches

Climate adaptation strategies listed here are drawn from the Forest Carbon Management Menu (Ontl et al. 2020) and the 2022 USDA Forest Service Climate Adaptation Plan (USDA Forest Service 2022). *See plan appendix 13 for crosswalk to the following plan components. See also the plan Climate Change and Carbon section for broad adaptive management approaches to climate change adaptation through vegetation management.*

**FW-MA-TMBR-12:** Utilize partnership-based approaches, including stewardship contracts, to increase effectiveness and efficiency of vegetation management project planning and

implementation. *See associated management approach FW-MA-CCC-02 in the “Climate Change and Carbon” section regarding collaboration with local communities.*

**FW-MA-TMBR-13:** Partner with local stakeholders and industry to innovate and support economically viable markets for both timber and nontimber forest products, including aspen, wood biomass, biochar, and small-diameter material. Actively apply for agency funds dedicated to support emerging, alternative forest product markets (*Resilience*). *See plan appendix 13 for link between this plan component and best available science and the agency’s climate adaptation plan.*

**FW-MA-TMBR-14:** Avoid permanent forest conversion to non-forest from management activities and/or uncharacteristic wildfire, while acknowledging that climate change adaptation may warrant accepting type conversions to non-forest or even the managed facilitation to non-forest (*Resistance, Resilience, Transition*).

**FW-MA-TMBR-15:** When developing integrated, landscape-scale ecological restoration projects, use the Forest Carbon Management Menu (Ontl et al. 2020), General Technical Report WO-95, or other best available science to inform strategies that support long-term carbon uptake and storage along with other management objectives. *See plan appendix 13 for forest plan direction crosswalk to climate adaptation strategies. (Resistance, Resilience).*

**FW-MA-TMBR-16: Climate-informed revegetation post-disturbance:**

- Create suitable conditions for natural regeneration through site preparation. (*Resistance, Resilience*)
- Promote regeneration of species currently present that have wide ecological tolerances and can persist under a wide variety of climate and site conditions. (*Resilience, Transition*)
- Favor or establish drought- or heat-tolerant species on south-facing slopes, sites with sandy or shallow soils, or narrow ridgetops. (*Resilience, Transition*)
- If seeding is needed in disturbed sites, identify and procure site-appropriate native plant materials and apply at time of year when site is accessible and to promote a successful outcome. The resulting herbaceous plant community should reflect project goals (e.g., stabilization, pollinator-friendly) and restore site conditions on trajectory toward desired conditions. (*Resilience*)
- Plant tree species expected to be adapted to future conditions and resistant to insect pests or present pathogens. (*Resilience, Transition*)
- Plant larger individuals (saplings versus seedlings, or containerized versus bare-roots stock) to help increase survival. (*Resistance, Resilience*)
- Plant a broader mix of species and trees with higher genetic variation than may have formerly been present, and allow natural selection to mediate tree survival. (*Resilience, Transition*)

**FW-MA-TMBR-17: Protect future-adapted seedlings and saplings:**

- Use repellent sprays, bud caps, or fencing to prevent browsing on species that are expected to be well-adapted to future conditions. (*Resilience, Transition*)
- Protect advanced regeneration from damage during timber harvest activities. (*Resilience*)

**FW-MA-TMBR-18: Use geographically diverse seeds:**

- Use mapping programs to match seeds (of same species) collected from a known origin to planting sites based on climatic information to optimize recruitment and survival in future climates. (*Resilience*)



- Identify and communicate needs for new or different genetic material to seed suppliers or nurseries to increase diversity of available stock. *(Resilience)*

**FW-MA-TMBR-19: Maintain carbon storage in low-vulnerability sites:**

- Increase retention of large diameter trees on sites with low vulnerability to drought stress or sites that otherwise minimize exposure to stressors that could increase tree mortality. *(Resistance)*
- Increase redundancy of important sites for existing carbon storage across the landscape. *(Resilience)*
- Promote silvicultural prescriptions that increase structural retention, such as selection cutting, shelterwood, or other low-intensity harvest methods. *(Resistance, Resilience)*

**FW-MA-TMBR-20: Minimize carbon loss from tree mortality:**

- In stands in which blowdown is not a concern to reduce competition, types, consider thinning even-aged stands to reduce competition for limited soil moisture on drought-prone sites. *(Resilience)*
- Consider reduction of stand densities in sites susceptible to beetle infestation. Use caution when thinning shallow-rooted species in mature stands, such as Engelmann spruce and lodgepole pine, as individual trees are prone to windthrow. Windthrown trees can trigger beetle outbreaks, leading to additional tree mortality. *(Resilience)*

**FW-MA-TMBR-21: Improve genetic fitness of native vegetation:**

- Remove unhealthy, declining species within a site to promote other species expected to fare better under current and future climate conditions. *(Transition)*
- Protect healthy legacy trees that fail to regenerate while deemphasizing their importance/representation in the mix of species being promoted for regeneration. *(Transition)*
- Plant or otherwise promote species that have a large geographic range, occupy a diversity of site locations, and are projected to have increases in suitable habitat and productivity. *(Transition)*

## **Transportation System (TSTN)**

*See also all direction and cross-references in the plan section “Infrastructure.”*

### **Desired Conditions**

**FW-DC-TSTN-01:** A minimum and efficient transportation system in the national forests is in place and maintained at least to the minimum standards appropriate for safe public access, for the protection of resources, and to support multiple uses that contribute to social and economic sustainability in the plan area. Conversely, road closures are effective in eliminating motor vehicle and mechanized traffic, and road decommissioning is effective in eliminating motor vehicle and mechanized traffic and restoring ecological integrity.

### **Standards**

*See also all direction and cross-references in the plan section “Watersheds and Water Resources.”*

**FW-STND-TSTN-02:** National Forest System roads shall be well-marked through the proper use of signage. National Forest System roads intended for use by high-clearance vehicles shall be clearly distinguished from those intended for standard passenger cars.

**FW-STND-TSTN-03:** National Forest System roads determined through the National Environmental Policy Act process to be unnecessary shall be either a) converted to another use, such as a trail, or b) decommissioned within 3 years of the determination.

**FW-STND-TSTN-04:** Methods used to decommission, close, or relocate routes shall be appropriate to the setting and designed and maintained to blend with the natural environment and with the established scenic integrity objective for the given area. Route closures are effectively maintained and enforced and are durable over time. Reinforce closed routes by proactively blocking off alternate access points in addition to the travel surface. *See also Forestwide standard SOIL-03 and plan appendix 3. See also FW-GDL-TMBR-07.b and GDL-TMBR-07.c regarding decommissioning of temporary routes.*

**FW-STND-TSTN-05:** Designation of roads, trails, and areas for travel shall comply with 36 CFR 212.55. These regulations require, among other aspects, the consideration of impacts of travel on other forest resources, and criteria to minimize those impacts. Project-level decisions with road-related work shall consider recommendations in forest travel analysis reports.

*See also Forestwide guideline SPEC-57 regarding restrictions in the conservation watershed network and SPEC-16 regarding travel reroutes.*

## Eligible Wild and Scenic Rivers (WSR)

### Desired Conditions

**FW-DC-WSR-01:** Eligible segments classified as “wild” are free of impoundments and waters are free flowing. Shorelines are essentially primitive with little or no evidence of human activity, with the exceptions of historical or culturally significant features. The areas are generally inaccessible except by trail for non-motorized travel. Water quality meets or exceeds State standards for aesthetics, for propagation of fish and wildlife adapted to the river habitat, and for human contact.

**FW-DC-WSR-02:** Eligible river segments classified as “recreational” may have some existing impoundment or diversion features, but waterways remain free flowing and riverine in appearance. Recreation river segments are accessible by road or trail, improvements occur, and encounters with people are expected.

**FW-DC-WSR-03:** The Outstandingly Remarkable Values (ORVs) and classifications of Wild and Scenic eligible river corridors are protected or enhanced until the rivers are designated or released from consideration.

**FW-DC-WSR-03.a:** Education and interpretative resources contribute to the public awareness of the eligible rivers in the GMUG National Forests.

### Standards

**FW-STND-WSR-04:** Management actions within the river corridors of eligible river segments shall be consistent with management direction contained in FSH 1909.12, chapter 80, section 84, FSM 2354, or other current direction.

*For other standards and guidelines for management in wild and scenic river corridors, whether explicitly due to their wild and scenic eligibility OR due to other overlapping values, see also requirements for management consistent with overlapping mapped plan allocations, including: desired, mapped scenic integrity objectives (FW-GDL-SCNY-03, revised plan maps, and detailed in plan appendix 3); areas suitable for timber production, revised plan maps, and detailed in plan appendix 8); desired, mapped recreation opportunity spectrum (ROS) settings (FW-GDL-REC-16*

*and revised plan maps). See also direction in plan section “Aquatic Species and Habitat, Riparian Management Zones, Groundwater-Dependent Ecosystems, Watersheds, and Water Resources.”*

## Chapter 3. Management Area Direction

### Overview

The GMUG National Forests contain several areas that require additional or different plan direction, identified in the revised plan as management areas. Some areas have been designated by Congress, such as designated wilderness or the Fossil Ridge Special Recreation Area; other areas have been allocated by the revised plan. Plan components for a management area may differ from Forestwide guidance by:

- Constraining an activity where Forestwide direction does not,
- Constraining an activity to a greater degree than Forestwide direction, or
- Providing an exception to Forestwide direction, when Forestwide direction would otherwise conflict with the management emphasis of the management area.

All Forestwide plan components are otherwise applied to management areas.

Where management areas overlap, the management direction for both layers apply. Where overlap occurs and results in multiple levels of restrictions, the more restrictive management area direction shall be applied.

The total acres within each management area category are listed in table 18. An alternative way to portray the management area allocations, with each of the discrete overlapping allocations identified is provided in table 19; this latter table sums to the total acres of National Forest System lands. *See plan appendix 1 for associated maps.*

**Table 18. Management area allocations, absolute totals**

[All acreages are rounded to 1,000 and therefore approximate]

Management Area Number	Management Area Description	Acres
1.1	Congressionally Designated Wilderness	553,000
1.2	Recommended Wilderness	68,000
1.3	Tabeguache and Roubideau Congressionally Designated Areas	28,000
2.1	Special Interest Areas	10,000
2.2	Research Natural Areas	1,000
2.3	Fossil Ridge Congressionally Designated Recreation Management Area	43,000
3.1	Colorado Roadless Areas	901,000
3.2	Wildlife Management Areas	823,000
4.1	Mountain Resorts	9,000
4.2	Recreation Emphasis Areas	40,000
5	General Forest and Rangelands	1,022,000

**Table 19. Management areas allocations, including breakout of overlapping categories**

[All acreages are rounded to 1,000 and therefore approximate]

Management Area Number	Management Area Description	Acres
1.1	Congressionally Designated Wilderness	553,000
1.2	Recommended Wilderness	5,000
1.2/3.1	Recommended Wilderness/CO Roadless Areas	63,000
1.3	Tabeguache and Roubideau Congressionally Designated Areas	28,000
2.1	Special Interest Areas	4,000
2.1/3.1	Special Interest Areas/CO Roadless Areas	5,000
2.1/4.2	Special Interest Areas/Recreation Emphasis Areas	1,000
2.2/3.1	Research Natural Areas/CO Roadless Areas	1,000
2.3	Fossil Ridge Congressionally Designated Special Recreation Area	36,000
2.3/3.2	Fossil Ridge Congressionally Designated Special Recreation Area/Wildlife Management Areas	7,000
3.1	CO Roadless Areas (no other overlapping MAs)	377,000
3.2	Wildlife Management Areas	361,000
3.2/3.1	Wildlife Management Area/CO Roadless Areas	455,000
4.1	Mountain Resort	9,000
4.2	Recreation Emphasis Areas	39,000
5	General Forest and Rangelands	1,022,000
<b>Total</b>		<b>2,967,000</b>

## Areas of Tribal Importance

### The 1873 Brunot Cession Area

The 1873 Brunot Cession between the Confederated Bands of the Ute Tribe and the U.S. Government ceded 3.7 million acres from the 15.7 million-acre 1868 Consolidated Ute Reservation when gold was discovered in the San Juan Mountains of the Territory of Colorado. The 1868 Ute Reservation had constituted about 5,800 square miles—five times more area than the entirety of the present GMUG National Forests—in the western third of the Colorado Territory. After the Brunot Cession, until 1881, the remaining Ute Tribe lands recognized by the U.S. Government constituted 12 million acres (*see plan appendix 1 for maps*). The Ute Tribe ceded the Brunot Area lands based on the right to continue hunting in them.

### Background

Euro-American miners first prospected in the San Juan Mountains during 1860–61, but it was not until 1869 that valuable minerals were discovered and not until 1871–72 that mining was securely established. The Ute Tribe had secured the San Juan Mountains and almost the entire western third of Colorado in the Treaty of 1868 with the U.S. Government. Although illegal, prospectors and miners nevertheless encroached into the 1868 Ute Reservation. “The practical need for the cession arose from the unlawful influx of miners into a portion of Ute treaty lands upon discovery of hard rock minerals in the San Juan Mountains” (Brief for the District Court of Wyoming by the Southern Ute Tribe in support of the petitioner as Amicus Curiae, p. 19, *Clayvin B. Herrera vs. State of Wyoming*, 17-532). Within just five years, mining interests resulted in the U.S. Government, as represented by Felix Brunot, securing the 1873 Brunot Cession with the Ute Tribe. Unlike earlier cessions or agreements between the U.S. Government and Tribal Governments, the Brunot Cession was technically not a treaty; treaties were considered to be agreements between sovereign nations, and the U.S. Government no longer recognized indigenous sovereignty after 1871.

In 1874 the U.S. Congress passed the Brunot Cession into Federal law (18 Stat., 36). Under the “reserved rights doctrine,” the hunting rights on any reservation lands relinquished by the Ute were retained. Article II of the Brunot Cession specified, “the United States shall permit the Ute Indians to hunt upon said lands so long as the game lasts and the Indians are at peace with the white people.” Article 3 also established a perpetual trust for the Ute Tribe, to be funded by the U.S. Government at \$25,000 per year, but managed by the U.S. President.

Although the Ute Tribe maintained their lowlands in the Brunot Area—fertile river valleys, plateaus, and mesas for continued hunting, farming, and ranching—white settlers continued to encroach on these Ute Tribe lands over the next decade. Tensions escalated until most Ute bands were eventually removed to the Uintah and Ouray Reservation by 1881, including escort by the U.S. Military, or to the Southern Ute Reservation in Colorado. A third Ute Reservation was established in 1915, the Ute Mountain Ute Reservation. The reserved hunting rights were not officially recognized by the newly established State of Colorado, established 11 months after the Brunot Cession.

More than one hundred years later, in 1978, the Ute Mountain Ute Tribe’s hunting rights were acknowledged when the Ute Tribe sued the State of Colorado for their historical hunting rights. The state reinstated the Ute Tribe’s rights under a consent decree that ensured enrolled members of the Ute Mountain Ute Tribe have the right to hunt deer and elk in the Brunot Area for subsistence, religious, or ceremonial purposes. The consent decree specified that Tribal members may hunt deer and elk without a state license year-round, providing that they obtain a Tribal hunting permit. In 2008, the Southern Ute Tribe signed a memorandum of understanding with the State of Colorado that

reinstated their reserved hunting and fishing rights within the Brunot Area, in accordance with comprehensive regulations established by the Ute Tribe. The memorandum of understanding, an annual proclamation, also expresses the intent of both governments to work cooperatively toward long-term conservation of wildlife within the area (Southern Ute Tribe). In 2013, the Ute Mountain Ute Tribe renegotiated and updated their agreement with the State of Colorado, similar to the Southern Ute Tribe, to include the Tribe's fishing rights and the right to hunt a certain number of black bears, moose, mountain goats, bighorn sheep, and mountain lions, in addition to the existing take of deer and elk within the Brunot Area. The consent decree permitted that Ute Tribe members may hunt other game animals without a license and without bag limits, but only during hunting seasons established by Colorado Parks and Wildlife. The Ute Indian Tribe has sought legal remedy to secure the same Brunot Cession rights to hunting and fishing, but these are not currently recognized by the State of Colorado.

The Brunot Cession Area spans today's GMUG, San Juan, and Rio Grande National Forests and portions of nine counties. In concert with these neighboring national forests, the GMUG will continue to ensure that the Ute Tribe's hunting and fishing rights of the 1873 Brunot Cession are upheld on public lands under Forest Service jurisdiction. *See volume I, chapter 3 of the final environmental impact statement, Areas of Tribal Importance for more information on the spatial overlap of the Brunot Cession Area with respect to the subsequent congressionally designated wilderness and the GMUG National Forests management area allocations in this forest plan.*

**FW-MA-ATI-01:** The GMUG will support the Ute Tribe's exercise of hunting and fishing rights per the 1873 Brunot Cession on public lands under Forest Service jurisdiction.

## Wilderness and Areas Where Natural Processes Dominate (MA 1)

### Congressionally Designated Wilderness – MA 1.1 (WLDN)

#### ***Desired Conditions***

**MA-DC-WLDN-01:** Each area's wilderness character is preserved or improved over time, supported by diverse and resilient native ecosystems. Natural disturbance regimes such as fire, insects, and disease generally occur without human influence or intervention. Non-native vegetation is rarely found, and infrastructure is uncommon or absent. *See also the Forestwide objective for air quality, AQ-04.*

**MA-DC-WLDN-02:** Recreation opportunities are primitive and unconfined, provide solitude, and promote self-reliance. Visitors are expected to be familiar with and use primitive skills in an environment that offers a relatively high degree of risk and challenge. Contact with others decreases with increasing distance from entry portals and trails. Resource impacts from recreational activities are not conspicuous, but persistent evidence of recreational use may be present in areas of frequent or concentrated use.

**MA-DC-WLDN-03:** Trails support public participation in wilderness recreation and preserve wilderness character. From entry portals, trails are the primary mode of travel, with their presence decreasing with increasing distance. Travel deep within wilderness is primarily cross-country without established trails.

#### ***Objectives***

**MA-OBJ-WLDN-04:** Within 10 years of plan approval, remove all non-historic structures and installations within wilderness areas, unless they are the minimum necessary for the administration of wilderness or otherwise authorized by law or existing private right, pursuant to the Wilderness Act of 1964.<sup>4</sup>

**MA-OBJ-WLDN-05:** Within 10 years of plan approval, initiate wilderness stewardship plans for each congressionally designated wilderness area for which the GMUG is the lead unit: West Elk, Raggeds, Fossil Ridge, La Garita, Mount Sneffels, Powderhorn, Uncompahgre, and Lizard Head. This excludes Maroon Bells-Snowmass, for which the White River National Forest is lead, and Collegiate Peaks, for which the Pike-San Isabel National Forests and Cimarron and Comanche National Grasslands is the lead unit. In the interim period between forest plan approval and wilderness management plan approval, the management of congressionally designated wilderness is guided by direction provided in table 9 through table 11.

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<sup>4</sup> Structures and installations (developments) are prohibited by Section 4(c) of the Wilderness Act of 1964, but Section 4(c) of the Act also provides for exceptions, when such features are the minimum requirement for the administration of the area for the purpose of the Act (*see Section 2(a)*). Decisions are informed by a minimum requirements analysis, which has two implicit steps: 1) determine whether action (feature) is *necessary* to the administration of the area as wilderness, and 2) determine the *action* that best preserves wilderness character.



## Standards

**MA-STND-WLDN-06:** To preserve wilderness character, the following shall be prohibited on all congressionally designated wilderness lands administered by the GMUG:

- Group size of more than 15 people. A combination of stock and people shall not exceed 25 per group, with the maximum amount of people per combined group limited to 15,
- Camping within 100 feet of any National Forest System trail or any waterbody,
- Using a fire, campfire, or wood-burning stove within 100 feet of any National Forest System trail or any waterbody,
- Hitching, tethering, hobbling, or fencing a horse or other pack or saddle animal in violation of posted instructions or within 100 feet of any National Forest System trail or any waterbody,
- Tying pack or saddle animal in violation of posted instructions or directly to trees, except during loading and unloading,
- Storing equipment, personal property, or supplies,
- Shortcutting a switchback in a National Forest System trail, and
- Possessing a dog that is off-leash or not under direct verbal control by the dog's owner or handler at all times, or a dog that is disturbing or damaging wildlife, other animals, people, or property.

## Guidelines

**MA-GDL-WLDN-07:** To preserve wilderness character, designate campsites, limit use, or otherwise manage visitor use when it degrades wilderness character. *See also the Forestwide standard for recreation REC-07.*

**MA-GDL-WLDN-08:** To preserve wilderness character, new trails should not be constructed in wilderness areas unless they are the minimum necessary for the administration of wilderness or otherwise authorized by law or existing private right, pursuant to the Wilderness Act of 1964<sup>5</sup>. If it preserves or improves wilderness character, existing trails may be realigned or reconstructed.

**MA-GDL-WLDN-09:** Where MA-STND-WLDN-06 is inadequate to preserve wilderness character, the following should be prohibited in specific sites or portions of wilderness areas in the GMUG or in areas for which the GMUG is the lead:

1. Camping within:
  - 300 feet of Sheep Lake in the West Elk Wilderness
  - 300 feet of Machin Lake in the La Garita Wilderness
  - The Wheeler Geologic Area in the La Garita Wilderness

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<sup>5</sup> Structures and installations (developments) are prohibited by Section 4(c) of the Wilderness Act of 1964, but Section 4(c) of the Act also provides for exceptions, when such features are the minimum requirement for the administration of the area for the purpose of the Act (*see Section 2(a)*). Decisions are informed by a minimum requirements analysis, which has two implicit steps: 1) determine whether action (feature) is *necessary* to the administration of the area as wilderness, and 2) determine the *action* that best preserves wilderness character.

- ¼ mile of Copper Lake, except at designated campsites, in the Maroon Bells-Snowmass Wilderness (White River National Forest is the lead)
- 2. Using a fire, campfire, or wood-burning stove within:
  - 300 feet of Sheep Lake in the West Elk Wilderness
  - 300 feet of Machin Lake in the La Garita Wilderness
  - The Wheeler Geologic Area in the La Garita Wilderness
  - The East Dallas Creek drainage in the Mount Sneffels Wilderness.
- 3. Hitching, tethering, hobbling, or fencing a horse or other pack or saddle animal within:
  - 300 feet of Sheep Lake in the West Elk Wilderness
  - 300 feet of Machin Lake in the La Garita Wilderness
- 3. Possessing a dog unless under physical restraint of a leash, except for working stock dogs or dogs used for legal hunting purposes, within:
  - The Oh-Be-Joyful valley in the Raggeds Wilderness
  - The Collegiate Peaks Wilderness (Pike-San Isabel-Cimmaron Comanche National Grasslands is the lead)
  - The Maroon Bells-Snowmass Wilderness (White River National Forest is the lead).
- 4. Possessing or storing food, trash, or other attractants, unless using the methods specified by Forest Order within:
  - the Maroon Bells-Snowmass Wilderness (the White River National Forest is the lead).

**MA-GDL-WLDN-10:** To preserve wilderness character, all wilderness management decisions and activities should be consistent with the wilderness management area direction found in the 1983 GMUG forest plan – which is carried forward in this forest plan as direction for the wilderness recreation opportunity spectrum (ROS) settings. Three distinct wilderness recreation opportunity spectrum subclasses are identified to correspond to each of the three 1983 wilderness management area categories. *See the Recreation section, Recreation Opportunity Spectrum section, table 9, table 10, and table 11.* The recreation opportunity spectrum maps in plan appendix 1 depict each of the mapped wilderness recreation opportunity spectrum subclasses.

### ***Management Approaches***

**FW-MA-WLDN-11:** Over the life of the plan, move toward wilderness managed to standard as identified in the Wilderness Stewardship Performance Guide for all wilderness areas where the GMUG is the lead national forest [all except Maroon Bells-Snowmass (White River National Forest) and Collegiate Peaks (Pike and San Isabel National Forests and Cimarron and Comanche National Grasslands)]. *See also the Chapter 4 Monitoring Plan, question 4.*

**FW-MA-WLDN-12:** Ensure coordination between the national forests and other land management agencies for co-administered/managed wilderness areas, such as Powderhorn Wilderness.

## **Recommended Wilderness – MA 1.2 (RECWLD)**

This section applies to the revised plan's administratively recommended wilderness. Should any recommended wilderness areas ultimately be designated by Congress as wilderness during the implementation period of this forest plan, the allocation Management Area 1.2 (RECWLD) would become moot for such areas. Management direction would be provided instead by the revised forest plan direction for Congressionally Designated Wilderness, Management Area 1.1 (WLDN), and any other parameters set forth in legislation.

### ***Desired Conditions***

**MA-DC-RECWLD-01:** The wilderness characteristics for which areas were recommended for wilderness are maintained or improved.

### ***Standards***

**MA-STND-RECWLD-02:** Recommended wilderness shall be managed consistently with the adjacent congressionally designated wilderness. Pre-existing authorized, non-conforming uses may continue so long as they do not impair the area's wilderness characteristics. *See also Table 12 for direction for the primitive recreation opportunity spectrum setting (ROS), which is assigned to all recommended wilderness at the time of the plan decision.*

### ***Objectives***

**MA-OBJ-RECWLD-03:** Within 5 years of plan approval, physically close all unauthorized routes within recommended wilderness and take actions that promote restoration along such routes.

## **Tabeguache and Roubideau Areas (MA 1.3)**

To maintain the existing wilderness character, management within the congressionally designated Tabeguache and Roubideau Areas is consistent with public law (16 U.S. Code 539i, section 9).

### ***Desired Conditions***

**MA-DC-TABROU-01:** Each area's wilderness character is maintained or improved over time, supported by diverse and resilient native ecosystems. Natural disturbance regimes such as fire, insects, and disease generally occur without human influence or intervention. Non-native vegetation is rarely found, and infrastructure is uncommon or absent.

**MA-DC-TABROU-02:** Recreation opportunities are primitive and unconfined, provide solitude, and promote self-reliance. Visitors are expected to be familiar with and use primitive skills in an environment that offers a relatively high degree of risk and challenge. Contact with others decreases with increasing distance from entry portals and trails. Resource impacts from recreational activities are not conspicuous, but persistent evidence of recreational use may be present in areas of frequent or concentrated use.

**MA-DC-TABROU-03:** Trails support public participation in wilderness recreation and maintain wilderness character. From entry portals, trails are the primary mode of travel, with their presence decreasing with increasing distance. Travel deep within the Tabeguache and Roubideau Areas is primarily cross-country without established trails.

## Objectives

**MA-OBJ-TABROU-04:** Within 10 years of plan approval, remove all non-historic structures and installations within Tabeguache and Roubideau Areas, unless authorized by law or valid existing right or essential for maintaining wilderness character.

**MA-OBJ-TABROU-05:** Within 10 years of plan approval, in a manner consistent with wilderness administration, complete wilderness character baseline assessments and initiate management planning for the Tabeguache and Roubideau Areas.

## Standards

**MA-STND-TABROU-06:** To maintain wilderness character, uses prohibited by Section 4(c) of the Wilderness Act of 1964 shall be prohibited within the Tabeguache and Roubideau Areas, including permanent or temporary roads, motor vehicles or other form of mechanical transport, motorized equipment, landing of aircraft, and structures or installations. Administrative exemptions may be granted when authorized by law or valid existing right or essential for maintaining wilderness character.

**MA-STND-TABROU-07:** To maintain wilderness character, consistent with the administration of wilderness areas in the GMUG, the following shall be prohibited within the Tabeguache and Roubideau Areas:

- Group size of more than 15 people or more than 10 stock animals.
- Camping within 100 feet of any National Forest System trail or any lake, stream, pond, river, or similar body of water.
- Building, maintaining, attending, or using a fire, campfire, or wood-burning stove within 100 feet of any National Forest System trail or any lake, stream, pond, river, or similar body of water, or above tree line.
- Hitching, tethering, hobbling, or fencing a horse or other pack or saddle animal in violation of posted instructions or within 100 feet of any National Forest System trail or any lake, stream, pond, river, or similar body of water.
- Tying pack or saddle animal in violation of posted instructions or directly to trees, except during loading and unloading.
- Storing equipment, personal property, or supplies.
- Shortcutting a switchback in a National Forest System trail.
- Possessing a dog that is off-leash or not under direct verbal control by the dog's owner or handler at all times, or a dog that is disturbing or damaging wildlife, other animals, people, or property.

## Guidelines

**MA-GDL-TABROU-08:** Activities, occupancies, and uses not expressly prohibited by the Colorado Wilderness Act of 1993 may be authorized by special use permit provided they do not degrade wilderness character. This includes commercial services to the extent that they are necessary for realizing area purposes.

**MA-GDL-TABROU-09:** To maintain wilderness character, designate campsites, limit use, or otherwise manage visitor use when it degrades wilderness character. *See also the Forestwide standard for recreation REC-07.*

**MA-GDL-TABROU-10:** To maintain wilderness character, new trails should not be constructed in the Tabeguache and Roubideau Areas unless authorized by law or valid existing right or essential for maintaining wilderness character. Existing trails may be realigned or reconstructed to maintain or improve wilderness character.

## Special Areas and Designations (MA 2)

### Special Interest Areas – MA 2.1 (SIA)

#### *Desired Conditions*

**MA-DC-SIA-01:** Special interest areas (table 20) preserve the characteristics for which the areas are established. Interpretive opportunities for public education and enjoyment are emphasized at Alpine Tunnel, Slumgullion Earthflow, and Ophir Needles Special Interest Areas. *See plan appendix 3 for the identified scenic integrity objectives for each area.*

**Table 20. Special interest areas**

Name	Acres	Category
Alpine Tunnel	500	Cultural
Dry Mesa Dinosaur Quarry	55	Paleontological
Ophir Needles	500	Geologic
Slumgullion Earthflow	290	Geologic
Mt. Emmons Iron Fen <sup>1</sup>	170	Botanical
Gunnison Research	8,200	Research
<b>TOTAL</b>	<b>9,700</b>	

<sup>1</sup> A 1999 Articles of Designation between the Colorado Natural Areas Program and the Gunnison Ranger District specifies further management prescriptions for this area.

#### *Objectives*

**MA-OBJ-SIA-02:** Within 5 years of plan approval, complete special interest area management plans, including official boundary descriptions and maps, for existing and newly designated special interest areas.

#### *Guidelines*

**MA-GDL-SIA-03:** To maintain the characteristics for which the special interest area is established, special use permits or other appropriate authorizations should be compatible with the special interest area, including the collection of rocks, minerals, and botanical or paleontological materials. To maintain botanical values in the botanical special interest areas, the collection of plants, rocks, or minerals should not be authorized in these special interest areas.

**MA-GDL-SIA-04:** To maintain the characteristics for which the special interest area is established, surface-disturbing activity should not be authorized within botanical, geologic, or hydrologic special interest areas, unless such activity would maintain or restore such characteristics.

## Research Natural Areas – MA 2.2 (RNA)

Management within research natural areas will be consistent with FSM 4063.

### *Desired Conditions*

**MA-DC-RNA-01:** Vegetation in research natural areas (table 21) is in a natural condition unaltered by human activities. Ecological processes such as succession and disturbance regimes (e.g., insect and disease, fire, climatic changes) occur within the natural range of variation for the ecosystem types for which each research natural area was established to represent as reference areas. Non-native plant species are absent.

**Table 21. Research natural areas**

Name	Acres	Vegetation Community
Gothic (existing research natural area)	1,072	Engelmann spruce-subalpine fir; alpine meadows
Dry Forks Escalante Creek (existing research natural area)	46	Blue spruce riparian

### *Standards*

**MA-STND-RNA-02:** To protect the Gothic Research Natural Area, camping and off-route travel is prohibited within its boundaries.

## Fossil Ridge Recreation Management Area (MA 2.3)

Management within the congressionally designated Fossil Ridge Recreation Management Area is consistent with public law (16 U.S. Code 539i, section 5).

## Natural Areas with Focused Management (MA 3)

### Colorado Roadless Areas – MA 3.1 (CRA)

Management within Colorado Roadless Areas is consistent with the 2012 [Colorado Roadless Rule](#), 36 CFR 294 Subpart D, *Colorado Roadless Area Management*. Note that although both designated Upper Tier Colorado Roadless Areas are combined with non-upper tier Colorado Roadless Areas as one management area in the forest plan for simplicity, nothing in the plan modifies the differences in management between these two designated categories of Colorado Roadless Areas. *See plan appendix 1 for a map of the designated boundaries of both Upper Tier and non-upper tier Colorado Roadless Areas per 36 CFR 294.*

#### **Desired Conditions**

**MA-DC-CRA-01:** Colorado Roadless Areas encompass large, relatively unaltered and unfragmented landscapes characterized by high-quality scenery, soil, air, and water; diverse, native plant and animal communities; functional, connected habitat for terrestrial and aquatic wildlife species, outstanding backcountry recreational experiences, and other roadless area characteristics, as defined at 36 CFR 294.41. Natural processes (such as insects, disease, and fire) occur within the context of the natural range of variation, and with minimal human intervention required to conserve or enhance roadless characteristics; mitigate risks to communities, public health and safety from high-intensity and imminent threat of wildfire and other catastrophic events; construct and preserve municipal water supply systems and other critical infrastructure; or provide for other authorized uses, pursuant to 36 CFR 294.42-44. Protect roadless values by restricting tree cutting, sale, and removal; road construction and reconstruction; and linear construction zones within Colorado roadless areas, with narrowly focused exceptions. Applying the exceptions (*see 36 CFR 294.42, 294.43, and 294.44*) may have effects to some roadless area characteristics (*see 36 CFR 294.41*).

**MA-DC-CRA-02:** Colorado Roadless Areas may contain primitive, semi-primitive non-motorized and semi-primitive motorized dispersed trail opportunities appropriate to the physical setting and recreation opportunity spectrum (ROS) setting. *See also 36 CFR 294.41 and 294.46 (e, f).*

#### **Standards**

**MA-STND-CRA-03:** Project activities in Colorado Roadless Areas must be designed to conserve the roadless area characteristics, if present, identified in 36 CFR 294.41, although applying the exceptions in § 294.42, § 294.43, and § 294.44 may have effects to some roadless area characteristics.

**MA-STND-CRA-04:** MA 3.1 relies on the definitions in the Colorado Roadless Rule 36 CFR 294.41. Prohibitions – and associated exceptions — are identified in 36 CFR 294.42 (prohibition on tree cutting, sale, or removal), 294.43 (prohibition on road construction and reconstruction), and 36 CFR 294.44 (prohibition on linear construction zones). Other activities may occur in MA 3.1 per 36 CFR 294.46.

## Wildlife Management Area – MA 3.2 (WLDF)

### **Desired Conditions**

**MA-DC-WLDF-01:** In Wildlife Management Areas (MA 3.2), large blocks of diverse habitat are relatively undisturbed by route and associated recreational use, providing security for the life history, distribution, migration, and movement of many species, including big-game species. Habitat connectivity is maintained or improved as fragmentation by routes is restricted. *See also the Forestwide direction for connectivity DC-ECO-05, Fire and Fuels Management GDL-FFM-03, Native Species Diversity DC-SPEC-01, DC-SPEC-02, OBJ-SPEC-03, DC-SPEC-12, GDL-SPEC -16, At-risk Species DC-SPEC-33, OBJ-SPEC-38, GDL-SPEC-45, Range DC-RNG-01, Recreation DC-REC-02, GDL-REC-12, Timber STND-TMBR-03, GDL-TMBR-09, Trails DC-TRLS-01, and Transportation DC-TSTN-01.*

### **Standards**

**MA-STND-WLDF-02:** To maintain habitat function and provide security habitat for wildlife species, there shall be no net gain in system terra (ground) routes, both motorized and non-motorized, where the system terra route density already exceeds 1 linear mile per square mile, as averaged within an individual Wildlife Management Area unit boundary. Consider habitat permeability trade-offs as to whether allowable new trail developments within a WMA should be concentrated near existing development versus more distributed throughout the unit.

Route density baselines for each Wildlife Management Area unit are indicated in Volume I of the Plan EIS. When analyzing the impact of proposed reroutes or new routes on route densities, an updated route density baseline for a given Wildlife Management Area unit should be calculated if:

- Corrections have been made to the mapping of system terra routes that were designated prior to the time of the plan decision, or
- A reroute is proposed for purposes of resource protection and demonstrates a benefit to wildlife resources, but the reroute would increase total route length. To avoid continued recreational use on the replaced route, the replaced route should be decommissioned in conjunction with the completion of the reroute, or
- Trails with switchbacks need to be accounted for within a wildlife management area unit. Switchbacks are necessary for sustainable trails, and accounting for switchbacks in the baseline route density of wildlife management areas should be a different calculation than through-routes on lower gradients; this accounting has not occurred at the time of the plan decision. Future accounting should be applied:
  - only for those switchbacks occurring on sustained steep slopes, and
  - using linear distance, with a reasonable starting and ending point for the switchback section/s.

**Exceptions:** 1) The route density cap does not apply to administrative routes or designated winter over-snow routes.

*See plan appendix 12, Footnotes Regarding Best Available Scientific Information for more detail supporting this plan standard.*

**MA-STND-WLDF-02.a:** Within both the Flat Top and Flat Top/Red Mountain Wildlife Management Areas in the Gunnison Ranger District, there shall be no new system terra routes. A reroute may be authorized if proposed for purposes of resource protection and would benefit sage-grouse and/or other wildlife habitat. To avoid continued use of the replaced route, the replaced route



should be decommissioned in conjunction with the completion of the reroute. *For direction for winter use in Flat Top and Flat Top/Red Mountain WMAs, see FW-GDL-SPEC-50.*

## **Objectives**

**MA-OBJ-WLDF-03:** Within 5 years of plan approval, identify potential area-specific management actions for each Wildlife Management Area to improve habitat connectivity and to achieve desired ecological conditions for constituent ecosystems. Within 10 years of plan approval, complete one action in each Wildlife Management Area.

## **Guidelines**

**MA-GDL-WLDF-04:** To maintain long-term habitat connectivity and function within Wildlife Management Areas, vegetation management in these management areas should be designed such that there is a long-term benefit to wildlife habitat, amongst other treatment objectives. *See also FW-DC-SPEC-12, STND-SPEC-35 (VEG S8), and management approaches for Canada lynx.*

## **Recreation Management Areas (MA 4)**

### **Mountain Resorts – MA 4.1 (MTR)**

#### **Desired Conditions**

**MA-DC-MTR-01:** Mountain resorts in the GMUG primarily provide for skiing and other snow sports and may also provide for other seasonal or year-round natural-resource-based recreational activities (e.g., hiking, mountain biking, and sightseeing). Recreation opportunities are managed for large numbers of visitors in developed settings. Where feasible and desired, other snow sports such as backcountry skiing, snowshoeing, and/or cross-country skiing opportunities may be facilitated or enhanced by visitor services.

**MA-DC-MTR-02:** The primary focus of the Mountain Resorts Management Area is the protection of sustainable recreation resources and public safety. Ecological values are provided to the extent possible while protecting the public and meeting primary recreation use objectives. Resource management activities are designed and implemented to maintain or enhance existing resources. Forested areas are managed as sustainable cover with a variety of species and age classes in patterns typical of the natural landscape character of the area. Disturbed areas are revegetated to protect scenery and minimize erosion.

**MA-DC-MTR-03:** Base areas in mountain resorts serve as entrance portals and are designed as gateways to public lands, including signage and/or interpretive elements to inform visitors about the public lands that the mountain resort encompasses. Facilities may be extensively used throughout the year to satisfy a variety of seasonal recreation use demands. Facilities and infrastructure are designed to blend with the national forest setting as seen from key viewpoints. Facilities that no longer serve a useful purpose are removed. Directional, regulatory, and informational signs are common and consistent with the mountain resort sign plan. Signs foster safe use, identify routes, and provide visitor information.

## Standards

**MA-STND-MTR-04:** Mountain resort management plans shall include vegetation management measures that are updated on a 10- to 20-year basis and/or when conditions have significantly changed due to shifts in forest health (e.g., insect and disease).

**MA-STND-MTR-05:** Snow management for mountain resorts, including snowmaking and snow-farming, shall be conducted in a manner that prevents slope failures and gully erosion, as well as bank erosion and sediment damage in receiving channels.

**MA-STND-MTR-05.a:** Any new seasonal or year-round facilities, trails, and improvements shall be guided by an accepted Master Development Plan.

## Guidelines

**MA-GDL-MTR-05.b:** Snow management for mountain resorts, including snowmaking and snow-farming, should comply with terms and conditions outlined in the ski area permit, and be conducted in a manner that does not conflict with State of Colorado water laws.

**MA-GDL-MTR-06:** To sustainably design infrastructure and recreational features and limit impacts to water resources and soils in mountain resorts, a geohazard and soils analysis should be conducted in the initial phases of project planning to assesses and provide information about the permit area such as slope stability, soil composition, and water supply, system and/or influence.

**MA-GDL-MTR-07:** To maintain a relatively natural-appearing setting, mountain resort infrastructure associated with other seasonal or year-round recreational activities should require limited permanent structures.

**MA-GDL-MTR-08:** To improve visitor safety, avoid physical hazards, manage known avalanche zones, or maintain policy compliance, mountain resort permit boundaries may be amended over time.

**MA-GDL-MTR-09:** To maintain high-quality scenery and recreational values in mountain resorts, and to sustainably achieve snow management objectives, stands and islands of trees should be managed to provide for a variety of species and size classes that perpetuate forest cover. Vegetative management should complement snow management objectives, scenery objectives, and recreation values, including the desired recreation opportunity spectrum (ROS) setting.

## Recreation Emphasis Areas – MA 4.2 (EMREC)

The areas mapped as recreation emphasis areas (Management Area 4.2, EMREC) in the forest plan represent a “snapshot” of areas of the national forests that are located along travelways and that currently experience extremely frequent, season-long dispersed camping and other recreational use; these corridors and areas are *not* intended to include all popular recreational areas in the national forests. Over the life of the forest plan, additional areas are likely to warrant focused recreation management, and their omission from this management area does not preclude the use of any of the following tools.

Management Area 4.2 (EMREC) signals the intent of the Forest Service to focus on areas in need of management attention to deliver desired sustainable recreation outcomes. Desired sustainable recreation outcomes include, but are not limited to, positive visitor satisfaction and consistency with desired recreation opportunity spectrum (ROS) settings. *See plan appendix 1 for maps.*

## **Desired Conditions**

**MA-DC-EMREC-01:** Recreation emphasis areas are popular areas for dispersed camping and/or feature recreation activities that take place near or at a large lake or reservoir, developed mountain resort, large campground, or trail system. Recreational use is contained, controlled, and/or enhanced through emphasis on National Forest System road, trail, and facility maintenance; increased visitor contact; stewardship education; and/or the expansion or accommodation of additional recreation opportunities such as designated camping, mountain biking, hiking, or river access. Within these recreation emphasis areas, other multiple uses and management activities are considered secondary to the primary objective of delivering desired sustainable recreation outcomes. Desired sustainable recreation outcomes include, but are not limited to, positive visitor satisfaction and consistency with desired recreation opportunity spectrum (ROS) settings. These recreation emphasis areas provide sustainable recreational settings and opportunities despite increasing or changing recreation use. Local communities and tourists can readily access these areas for a variety of motorized, mechanized, and non-motorized activities. These areas provide opportunities for national forest visitors who may seek moderate-to-high levels of social interaction as a distinct component of their desired recreation experiences. Natural ecological processes and disturbances may be present within these areas, and vegetation management activities occur as long as they are conducted in support of desired sustainable recreation outcomes. *See also the Forestwide desired condition for partnerships, PART-01.*

## **Objectives**

**MA-OBJ-EMREC-02:** Within 5 years of plan approval, accomplish management actions in at least five noticeably degraded dispersed overnight use areas (rated as an overall impact rating of 6 to 8 using the National Minimum Recreation Site Monitoring Protocol), as detailed in recreation standard FW-STND-REC-07. The standard REC-07 will be applied to determine when thresholds have been reached and more active management is needed. The objective will be achieved when the executed management actions decidedly address the issues that led to the thresholds being reached or surpassed in the first place. Initial priority areas include:

- Crested Butte,
- Taylor Park,
- Any other applicable overnight use locations identified on the EMREC map,
- Existing campsites within the riparian management zone (*See Riparian Management Zones section*).

*See also, Recreation Management Approaches section for more information on implementation.*

**MA-OBJ-EMREC-03:** Within 5 years of plan approval, accomplish management actions in at least five noticeably degraded areas from dispersed day-use activities (e.g., hiking, angling, picnicking), as detailed in the Forestwide recreation standard, FW-STND-REC-08. Standard REC-08 will be applied to determine when thresholds have been reached and more active management is needed. The objective will be achieved when the executed management actions decidedly address the issues that led to the thresholds being reached or surpassed in the first place. Initial priority areas include:

- Existing unauthorized trails within sensitive areas (e.g., riparian or high alpine areas).
- Any applicable day-use locations identified on the EMREC map.

*See also, the Forestwide objective for trails (FW-OBJ-TRLS-02) and the Recreation Management Approaches section for more information on implementation.*

## **Guidelines**

**MA-GDL-EMREC-04:** To improve recreational experiences and curtail natural resource impacts, any of the following management controls should be implemented within recreation emphasis areas if and when biophysical and/or social indicators listed in recreation standards FW-STND-REC-07 and 08 trigger the need for responsive management action:

- Camping only in designated sites
- Shorter stay limits for camping
- Parking restrictions
- Developed facilities
- On existing National Forest System routes, establishing directional trails
- Constructing larger accessible trails or boardwalks
- Designing parallel National Forest System routes or stacked loops
- Restrictions on mode of transportation for existing trails.

**MA-GDL-EMREC-05:** To concentrate and minimize ecological impacts, new developments and facilities should use existing, impacted areas where possible.

**MA-GDL-EMREC-06:** To achieve and maintain the primary objective of delivering on desired sustainable recreation outcomes within Recreation Emphasis Areas (Management Area 4.2), vegetation management activities should only be conducted if needed to maintain, improve, or protect the recreation setting, maintain and protect utility lines, maintain and protect infrastructure, and/or reduce risk of wildfires.

**MA-GDL-EMREC-06.a:** To reduce the likelihood of establishing unplanned new visitor use patterns, all temporary roads, skid trails, and landings developed in compliance with MA-GDL-EMREC-06 within recreation emphasis areas should be constructed and fully decommissioned to discourage new visitor use of those features. Exception: if the disturbance could result in improvement of existing, or development of desired, recreation infrastructure.

*See also the Forestwide Recreation; Trails; Transportation; and Infrastructure sections.*

## **General Forest and Rangelands (MA 5)**

*See chapter 2, Forestwide direction.*

## Chapter 4. Monitoring

### The Role of Monitoring per the 2012 Planning Rule

The National Forest Management Act requires “continuous monitoring and assessment in the field” to evaluate “the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land” (16 USC 1604(g)(3)(C)). The 2012 Planning Rule emphasizes a three-part iterative cycle of assessment, planning, and monitoring in a continuous feedback loop to support continuous improvement of the plan direction and implementation. This framework is designed to “inform integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change, and improve management based on new information and monitoring” (219.5 (a)).

The monitoring plan should be strategic, effective, and useful. As such, it does not replace project-level monitoring, but rather it provides higher-level information to help review the efficacy of the forest plan and progress toward desired conditions. Direction for monitoring and evaluation of forest plans is contained in 36 CFR 219.12, and in planning directives at 1909.12, chapter 30.

### Specific Requirements for Monitoring per the 2012 Planning Rule

A forest monitoring plan consists of monitoring questions and indicators that are designed to inform the management of resources in the national forests by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan’s desired conditions or objectives. The monitoring plan must also be coordinated with the Regional Forester and Forest Service State and Private Forestry and Research and Development (219.12 (a)(1)), and it should consider broader-scale monitoring to address questions at a regional or geographic scale (219.12 (b)). This monitoring plan was informed by public input received throughout the development of the forest plan (219.4(a)). Implementation of the monitoring plan will be best achieved through active partnerships; *see also the Forestwide desired condition for partnerships, PART-01*.

Monitoring may evaluate compliance with standards and guidelines (implementation monitoring), the effectiveness of management actions, standards and guidelines to achieving goals and objectives (effectiveness monitoring), and long-term trends and conditions of key resources (condition or surveillance monitoring). At a minimum, the plan monitoring program must contain one or more monitoring questions and associated indicators that address the following eight required items (*see 36 CFR 219.12[a][5][i-viii]*):

- i. The status of select watershed conditions,
- ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems,
- iii. The status of focal species to assess the ecological conditions required under 219.9,
- iv. 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,
- v. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives,

- vi. Measurable changes in the plan area related to climate change and other stressors that may be affecting the plan area,
- vii. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities, and
- viii. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

A forest plan monitoring report will be produced and published every two years (219.12 (d)). It “must indicate whether or not a change to the plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information... [and] must be used to inform adaptive management of the plan area” (219.12 (d)(2)). The monitoring program and evaluation report are part of the administrative record (219.14 (b)), and the Forest Supervisor must document “how the best available scientific information was used to inform planning, the plan components, and other plan content, including the plan monitoring program” (219.13 (a)(4)).

## **Focal Species**

Focal species (item iii above) are a small subset of species whose status permits inference to the integrity of the larger ecological system to which they belong. Focal species monitoring provides information regarding the effectiveness of the plan in providing the ecological conditions necessary to maintain the diversity of plant and animal communities and the persistence of native species in the plan area. They should act as indicators for the attributes of community composition, structure, connectivity or function, or factors that regulate them.

An effective focal species or assemblage of species will be sensitive to the ecosystem components or habitat attributes of concern. Monitoring questions should relate the species to the ecological condition and reason for its selection; indicators may include affected attributes of the species, such as presence or occupancy, habitat use, reproductive rate, and population trends. If the focal species’ sensitivity to habitat changes cannot be directly attributable to a cause-and-effect relationship, then the influence of habitat change on the focal species may not be separable from the influence of other factors on the species, such as climate change, predation, disease, or competition.

Focal species are intended to reduce the cost and effort of ecosystem monitoring and should only be used when direct measurement of resources is not efficient or practical.

At the time of the GMUG plan decision, the selected focal species for the GMUG is sagebrush. Focal species may be added or modified over time via administrative change.

## **Best Available Scientific Information and Fiscal Constraints**

Evaluating ecosystem integrity and sustainability requires the synthesis and interpretation of high-quality data and information from multiple social and ecological scales. While the 2012 Planning Rule directs national forests to use the best available scientific information for plan monitoring, it also recognizes the need to remain within the staffing and financial capabilities of the unit. To meet these goals, the proposed forest plan monitoring strategy supplements data and information collected by the GMUG with other best available scientific information, drawing on data collected by federal, state, and other partners. For example, the Forest Service Research’s Forest Inventory and Analysis (FIA) program provides national forest units with the longest continuous forest census, which can be used to evaluate potential management impacts on long-term forest condition trends.

## Forest Plan Monitoring Framework

The forest plan monitoring framework addresses each of the eight monitoring requirements (per 36 CFR 219.12[a][5][i-viii]), is based on the best available scientific information, and is feasible to implement with existing resources. It is designed to promote iterative evaluation of plan components associated with social and ecological desired conditions, and to facilitate effective and efficient biennial reporting.

Monitoring questions, indicators, measures, and adaptive management actions for selected plan components are provided in the following tables, grouped by the following plan categories:

- Key ecosystem characteristics (table 22)
- Soil (table 23)
- Watershed, aquatic, riparian management zone, and conservation watershed network (table 24)
- Invasive species (table 25)
- Native species (table 26)
- Socioeconomic (table 27)
- Range and Timber (table 28)
- Trails (table 29)
- Recreation (table 30)
- Wilderness (table 31)
- Air quality (table 32)

In the following tables, the monitoring framework is composed of the following elements:

**Monitoring Requirement** identifies which of the eight forest plan monitoring requirements are addressed (per 36 CFR 219.12[a][5][i-viii]), as detailed above, such as “status of select watershed conditions.” (See column 1, table 22-through table 32, roman numeral numbers i-viii; note rows are repeated per each separate indicator applied to a given monitoring requirement).

**Monitoring Question** is the plan-level monitoring question. Monitoring questions are of high relevance for forest planning and decision-making and will be used to test relevant assumptions, track relevant changes, and measure progress toward achieving desired conditions. The monitoring question numbers are not sequential, as each table groups multiple distinct questions by a particular plan resource section (e.g., *Trails*). Monitoring questions are often pertinent to two or more monitoring requirements. (See column 1, table 22 through table 32, questions 1 through 12; note rows are repeated for each separate indicator applied to a given monitoring requirement).

**Associated Plan Components** are examples of primary plan components relevant to the monitoring question, but is not exhaustive. While each table corresponds to an individual plan resource section (e.g., *Soils*), additional related plan components from other resource sections are included. (See column 2, table 22 through table 32).

**Indicators and Measures** are measurable attributes of social or ecological conditions that can be used to answer monitoring questions and evaluate progress toward maintaining or achieving desired conditions (See column 3, table 22 through table 32).

**Data Source** represents the datasets or sources of information relevant to the indicators. New data sources will likely become available over the life of the plan, and data sources that are identified at the time of the plan decision may become obsolete. Forest Service staff recognize the need for

adaptive management of the monitoring plan and periodic updates (*See column 4, table 22 through table 32*).

**Frequency** describes the timing and frequency of data availability for monitoring reports. Frequencies are determined by the frequency of data collection and/or the spatial and temporal variability of resources (e.g., it takes several years of data collection to establish a trend for many resources) (*See column 4, table 22 through table 32*).

**Adaptive Management Actions:** The monitoring plan also includes adaptive management actions that are paired with each monitoring question. These actions are intended to serve two primary functions. First, they highlight the relevance of the monitoring questions and data to land management decision-making. Without this lens it can be difficult to sift through volumes of data and analyses to identify salient, possibly actionable information and decision-points. Second, they offer some specific examples of how monitoring data may be used to adapt management actions, as management should be informed and adapt to information regarding changing conditions, stagnant or declining conditions where the goal is to achieve some improvement, or new information about the status of natural resources in the national forests.

These actions are not an exhaustive list of potential adaptive management actions. Instead, they highlight potential ways monitoring data might be considered by line officers and land managers to adaptively inform their decision-making and potentially revised plan direction. (*See column 5, table 22 through table 32*).



**Table 22. Monitoring questions, indicators, measures, and adaptive management actions for select key ecosystem characteristic plan components**

[FACTS, Forest Activity Tracking System; FIA, Forest Inventory and Analysis program; MTBS, Monitoring Trends in Burn Severity program; PSA, predictive services area; SNOTEL, snow telemetry system operated by the Natural Resources Conservation Service; SPEI, standardized precipitation evapotranspiration index]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
6. How is the GMUG climate changing relative to historic norms? (vi)	FW-DC-ECO-03	<p>a. Temperature (monthly mean by PSA), precipitation (monthly total, PSA), drought (either the SPEI index or the Moisture Difference Z-score (MDZ) drought index)</p> <p>b. Snowpack: 1) peak snowpack date and amount 2) Snow-off date and 3) Snow-on date (date when consistent snowpack begins, not just first date of any snow) for SNOTEL stations in the GMUG.</p> <p>c. Alpine vegetation*</p> <p>d. Accumulated Winter Season Severity Index (AWSSI)</p> <p>*This information may be contingent upon GMUG ability to commit financial resources to support this monitoring.</p> <p>Note that other indicators throughout this monitoring plan inform question 6, including but not limited to question 7 (e.g., fire occurrence); 11 (e.g., stream temperature); 12 (e.g., changes in habitat of focal species: sagebrush).</p>	<p><b>a. Data source:</b> <a href="#">WestWideDroughtTracker</a> (Western Regional Climate Center 2021) or the <a href="#">Moisture Deficit and Surplus Application</a></p> <p><b>Frequency reported:</b> 2 years</p> <p><b>b. Data source:</b> Natural Resources Conservation Service</p> <p><b>Frequency reported:</b> Annually; incorporated into every biennial forest plan monitoring report</p> <p><b>c. Data source:</b> Mountain Studies Institute and/or Colorado Natural Heritage Program alpine vegetation transect monitoring</p> <p><b>Frequency reported:</b> Bi-annual</p> <p><b>d. Data source:</b> <a href="#">Accumulated Winter Season Severity Index</a></p> <p><b>Frequency Reported:</b> Annually; incorporated into every biennial forest plan monitoring report</p>	If climatic trends are significantly inconsistent with those forecasted at the time of the plan decision and ecological conditions are trending away from desired conditions, consider additional or revised plan direction.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii)	FW-DC-ECO-02	Influence of disturbance, management, and environmental factors on carbon stocks and forest biomass density	<p><b>Data source:</b> GMUG Carbon White Paper (derived from FIA data, Landsat-derived disturbance maps, and various empirical and allometric models)</p> <p><b>Frequency Reported:</b> every 10 years</p>	If carbon trends are significantly inconsistent with those forecasted at the time of the plan decision and ecological conditions are trending away from desired conditions, consider additional or revised plan direction.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, iv, viii, vii)	<b>FW-DC-ECO-01</b> <b>FW-DC-ECO-02</b> <b>FW-GDL-ECO-07</b>	Cover type, Structural stage: proportion of area in early-, mid-, late-seral stages; Number of large trees per acre by forest type	<b>Data source:</b> FIA* *Note that FIA data only encompasses forested ecosystems. Non-forested ecosystems are represented by other indicators for question 7, as well as question 12 (focal species/habitat: sagebrush). <b>Frequency reported:</b> 10 years	Distribution of seral stages relative to desired conditions informs priorities for vegetation management.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-DC-ECO-01</b> <b>FW-DC-ECO-02</b> <b>FW-GDL-ECO-07</b>	Seedlings and saplings per acre by ecosystem	<b>Data source:</b> FIA, FACTS (natural regeneration stocking survey data, planting survival rates) <b>Frequency reported:</b> 10 years	Planting survival and trends in regeneration on FIA plots inform species selection for seedling planting projects.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-DC-ECO-01</b> <b>FW-DC-ECO-02</b> <b>FW-GDL-ECO-07</b> <b>FW-GDL-ECO-08</b>	Snags per acre, down wood per acre	<b>Data source:</b> FIA <b>Frequency reported:</b> 10 years	Prioritize wildlife habitat management in ecosystems with snags or coarse wood outside of desired condition quantities.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-DC-ECO-01</b> <b>FW-DC-ECO-02</b> <b>FW-GDL-ECO-07</b>	Occurrence, location, acreage, severity, behavior of wildland fire. Summary of beneficial acres analysis.	<b>Data source:</b> GMUG fire occurrence and fire perimeter data, MTBS, FACTS, beneficial acres reports, fire behavior observations <b>Frequency reported:</b> 2 years	Consider how disturbance locations fit into spatial landscape treatment priorities. Adjust high priority areas based on new disturbances/treatments.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-DC-ECO-01</b> <b>FW-DC-ECO-02</b> <b>FW-GDL-ECO-07</b>	Extent, severity, and locations of insect- or disease-caused tree mortality	<b>Data source:</b> Aerial detection surveys <b>Frequency reported:</b> 2 years	If aerial detection survey shows white pine blister rust, institute field monitoring for bristlecone and limber pine populations.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	FW-DC-ECO-01 FW-DC-ECO-02 FW-GDL-ECO-07 FW-GDL-ECO-08	Vegetation management activities (with habitat/ecosystem, and/or fuels objectives)	<b>Data Source:</b> FACTS, WIT (database of record) <b>Frequency reported:</b> 2 years	<i>(This is a reporting measure to track extent of vegetation management actions. This indicator can inform adaptive management in response to trends noted per other indicators for question (7).)</i>
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	FW-DC-ECO-01 FW-DC-ECO-02 FW-GDL-ECO-07 FW-DC-SPEC-37	Range condition and trend	<b>Data source:</b> GIS updated with field data <b>Frequency reported:</b> 10 years	Decreasing trends could trigger change in livestock numbers, class, or season of use.

**Table 23. Monitoring questions, indicators, measures, and adaptive management actions for select soil plan components**

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
9. What is the status and trend of soil productivity and function? (viii)	FW-DC-SOIL-01 FW-STND-SOIL-02	Amount of detrimental soil disturbance per forest soil disturbance monitoring protocol, status of implementation of national core best management practices (FS 990A) for water quality management.	<b>Data source:</b> Field data, BMP monitoring review forms <b>Frequency reported:</b> 2 years	If monitoring indicates exceedances of the detrimental soil disturbance threshold, it may indicate the need for additional or revised plan direction, or increasing the pace and scale of related objectives that can contribute to an improved trend.

**Table 24. Monitoring questions, indicators, measures, and adaptive management actions for select watersheds and water resources, aquatic species and habitat, riparian management zone and groundwater-dependent ecosystems, and conservation watershed network plan components**

[GDE, Groundwater-dependent ecosystem; HUC 12, hydrologic unit 12 code]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
8. What is the status and trend of conditions in priority watersheds? (i)	<b>FW-DC-WTR-01</b> <b>FW-OBJ-WTR-04</b>	Completion of projects identified in watershed restoration action plans.	<b>Data source:</b> WCATT database <b>Frequency reported:</b> 2 years	<i>(This is a reporting measure to track extent of completed restoration actions. This indicator can inform adaptive management in response to trends noted per other indicators for question (10); for example, whether additional restoration actions are needed to achieve desired conditions.)</i>
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-WTR-03</b>	Number of State-listed impaired or potentially impaired waters (including 303(D) and Monitoring and Evaluation list)	<b>Data source:</b> Colorado Department of Public Health and Environment Regulation 93, composed of Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List (per implementation of Clear Water Act section 303(d) requirements). <b>Frequency reported:</b> 2 years	If causal factors for existing and new impaired water listings are in part or wholly attributed to current GMUG activities, or to legacy activity for which the GMUG can contribute to restoration (e.g., AML remediation), this indicator can inform adaptive management to restore or to modify contributing contemporary management practices.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-AQTC-01</b>	Water temperature, turbidity, instream sedimentation, water flows	<b>Data source:</b> Field data; partners (Colorado Parks and Wildlife, Colorado Water Conservation Board, Colorado Department of Public Health and Environment Regulation 93) <b>Frequency reported:</b> 6 years	If trending away from desired conditions, and GMUG management activities (legacy or existing) are contributing to the declining trend, consider revised or additional plan direction, or increasing the pace and scale of objectives that could improve trend.
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-OBJ-RMGD-06</b>	Number of fish passage barriers removed or created; miles of road decommissioned with riparian management zone; culverts removed and/or replaced; riparian acres and stream miles of habitat improvements.	<b>Data source:</b> WIT; partners (Colorado Parks and Wildlife; Colorado Water Conservation Board) <b>Frequency reported:</b> 2 years	<i>(This is a reporting measure to track extent of completed restoration actions. This indicator can inform adaptive management in response to trends noted per other indicators for question (10); for example, whether additional restoration actions are needed to achieve desired conditions.)</i>
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-RMGD-01</b> <b>FW-STND-RNG-08</b> <b>FW-STND-RNG-08.a</b> <b>FW-STND-RNG-08.b</b> <b>FW-GDL-RNG-09</b> <b>FW-GDL-RNG-11.a</b>	Percent streambank stabilization; sediment levels; stubble height; water temperatures; turbidity; game cameras	<b>Data source:</b> Field data <b>Frequency reported:</b> 6 years	If permitted livestock grazing is determined to be a causal factors for declining trend for these indicators, revise grazing practices or allotment management plans where needed.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-RMGD-01</b> <b>FW-DC-WTR-01</b> <b>FW-DC-WTR-03</b> <b>FW-STND-WTR-05</b>	Status of implementation of national core best management practices (FS 990a) for water quality management	<b>Data source:</b> Field data/project-level best management practice review forms  <b>Frequency reported:</b> 2 years (required annually)	<i>(This is a reporting measure to track extent of completed BMPs. This indicator can inform adaptive management in response to trends noted per other indicators for question (10); for example, whether additional plan direction or restoration actions are needed to achieve desired conditions.)</i>
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (Specifically, fen wetlands)	<b>FW-DC-RMGD-05</b> <b>FW-DC-RMGD-02</b> <b>FW-OBJ-RMGD-6.a</b> <b>FW-STND-RMGD-09, 09.a, 09.b</b> <b>FW-GDL-RMGD-11.a, RMGD-14</b>	<b>Condition of fen wetlands:</b> Groundwater levels, vegetation, and water chemistry  <b>Fen wetlands and other riparian areas:</b> beaver presence/absence	<b>Groundwater:</b> <b>Data source:</b> Project-level monitoring; Dwire et al. study on the GMUG (Dwire 2021/ongoing) <b>Frequency reported:</b> as available.  <b>Beavers:</b> <b>Data source:</b> HUC-12 watersheds or stream reaches with beaver activity <b>Frequency reported:</b> 2 years	If Dwire or other project-level monitoring indicate minimum plan buffer for fen wetlands is insufficient, modify FW-STND-RMGD-07 buffer size and/or other plan direction for fen wetlands.  If permitted livestock grazing is determined to be a causal factor for declining trend for these indicators, revise grazing practices or allotment management plans where needed.  If data indicate that there are watersheds or stream reaches that would benefit, consider supporting beaver relocation and/or construction of beaver dam analogs.

**Table 25. Monitoring questions, indicators, measures, and adaptive management actions for select invasive species plan components**

[FACTS, Forest Activity Tracking System; TESP/IS, threatened, endangered, and sensitive plants / invasive species]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-DC-IVSP-01</b> <b>FW-OBJ-IVSP-02</b> <b>FW-STND-IVSP-04</b> <b>STND-IVSP-05</b> <b>GDL-IVSP-07</b> <b>GDL-IVSP-08</b> <b>GDL-IVSP-08.a</b> <b>GDL-SPEC-23</b>	Acres of invasive plants; treatment records with success rate (efficacy of treatment); stream miles with aquatic nuisance species or whirling disease; western toad (previously named the "boreal toad") sites with/without chytrid fungus	<b>Data source:</b> FACTS; TESP/IS <b>Frequency reported:</b> 2 years	If treatment success rate is low, adjust treatment strategies.  If declining trend in extent of invasives and ANS, reconsider management practices that contribute to invasives introduction and spread; consider modified or additional plan direction.

**Table 26. Monitoring questions, indicators, measures, and adaptive management actions for select native species plan components**

[CPW, Colorado Parks and Wildlife]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-SPEC-53</b> <b>FW-OBJ-SPEC-54</b>	Threats to target species (green lineage Colorado River cutthroat trout, western toad (previously named the "boreal toad")) in conservation watershed networks in the GMUG	<b>Data source:</b> Field data <b>Frequency reported:</b> 6 years	Once threats are identified, per OBJ-SPEC-54, <i>"Within 10 years of plan approval, complete two activities to address these threats."</i>

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
10. What is the status and trend of aquatic and riparian ecosystem integrity in the GMUG? (ii)	<b>FW-DC-SPEC-53</b>	Extent of ground-disturbing projects within conservation watershed network subwatersheds, sediment levels, instream water flows, and stream temperature	<b>Data source:</b> Field data <b>Frequency reported:</b> As relevant (project-based)	If trending away from desired conditions, and GMUG management activities (legacy or existing) are contributing to the declining trend, consider revised or additional plan direction, or increasing the pace and scale of objectives that could improve trend.
11. What is the status and trend of terrestrial wildlife, birds, and insects and their habitats (including at-risk species and focal species)? (iii, vii, iv)	<b>FW-GDL-SPEC-07</b>	Migratory bird counts	<b>Data source:</b> <a href="#">Bird Conservancy of the Rockies</a> (2021); purple marten monitoring data, Natural Resource Information System wildlife data <b>Frequency reported:</b> 2 years	If declining trend, and GMUG management activities (legacy or existing) are contributing to the declining trend, consider revised or additional plan direction.  Consider increasing the pace and scale of objectives that could improve trend.
11. What is the status and trend of terrestrial wildlife, birds, and insects and their habitats (including at-risk species and focal species) in the GMUG? (iii, vii, iv)	<b>FW-DC-SPEC-17</b> <b>FW-GDL-SPEC-27</b>	Uncompahgre fritillary butterfly population counts and colony maps	<b>Data source:</b> Western Colorado University Recovery Plan (tier to monitoring in Recovery Plan) and Species Status Assessment, or other best available science <b>Frequency reported:</b> 2 years	If populations show declining trend, consider additional management of possible risk factors via guideline SPEC-27, including domestic sheep trailing and recreation impacts.



Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
11. What is the status and trend of terrestrial wildlife, birds, and insects and their habitats (including at-risk species and focal species) in the GMUG? (iii, vii, iv)	<b>FW-DC-SPEC-02</b> <b>FW-GDL-SPEC-15</b> <b>FW-GDL-SPEC-16</b>	Post-hunt big game population estimates; potential shifts in elk, mule deer, and bighorn sheep core habitat areas, seasonal habitat ranges, species production areas, and species seasonal concentration areas; rangeland conditions including presence/extent of invasives	<b>Data source:</b> CPW, including herd management plans; <a href="#">Rangeland Analysis Platform</a> <b>Frequency reported:</b> annually for post-hunt big game population estimates; 4 years for all other indicators and measures	If post-hunt population estimates show declining trend below CPW population objectives, or if CPW-mapped species habitat is shifting, coordinate with CPW to identify factors contributing to declines and consider additional management of possible risk factors via plan direction, including but not limited to FW-GDL-SPEC-15 and FW-GDL-SPEC-16.
11. What is the status and trend of terrestrial wildlife, birds, and insects and their habitats (including at-risk species and focal species) in the GMUG? The GMUG focal species is sagebrush. (iii, vii, iv)	<b>FW-DC-SPEC-36</b> <b>FW-DC-SPEC-37</b>	Gunnison sage-grouse lek counts and trends.  <i>Focal species: sagebrush:</i> extent of sagebrush and subspecies composition; presence/extent of invasive plant species; treatment success for invasives	<b>Data source:</b> Forest Service data, CPW; U.S. Fish and Wildlife Service  Recovery Plan (tier to monitoring in Recovery Plan) and Species Status Assessment, or other best available science.  Invasive species: FACTS; TESP/IS <b>Frequency reported:</b> 2 years	If populations show declining trend, consider additional management of possible risk factors via U.S. Fish and Wildlife Service Recovery Implementation Strategy
11. What is the status and trend of terrestrial wildlife, birds, and insects and their habitats (including at-risk species and focal species) in the GMUG? (iii, vii, iv)	<b>FW-DC-SPEC-17</b>	Select populations of at-risk plant species	<b>Data source:</b> Forest Service data <b>Frequency reported:</b> 2 years	

**Table 27. Monitoring questions, indicators, measures, and adaptive management actions for select socioeconomic plan components**

[IMPLAN, Impact analysis for PLANning; NVUM, National Visitor Use Monitoring program]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
5. What is the status and trend of the contribution of forest goods and services to economic activity in the local area? (vii)	<b>FW-DC-SCEC-01</b>	Economic contribution (in terms of employment, labor income, and value added) to the local area associated with authorized activities in the GMUG including: <ul style="list-style-type: none"> <li>timber harvest and processing, for example per forest products cut and sold reports</li> <li>spending by recreationists (including hunting and fishing),</li> <li>forage for livestock grazing,</li> <li>mineral production, and</li> <li>payments to counties.</li> </ul>	<p><b>Data source:</b> Regional Office <a href="#">IMPLAN</a> analysis</p> <p>Recreation visitation (<a href="#">NVUM</a>)</p> <p>Permitted and authorized animal use months</p> <p>Payment In Lieu of Taxes payments</p> <p><a href="#">Secure Rural School</a> payments</p> <p>Locatable and salable mineral production</p> <p>Leasable mineral sales volume, value, and revenue</p> <p>Timber volume cut and sold (<a href="#">Forest Products Cut and Sold from the National Forests and Grasslands</a>)</p> <p>Annual fishing days; hunting licenses; outfitter days in the GMUG (per Colorado Parks and Wildlife).</p> <p>Additional data sources for question 5 include county-provided information (e.g., tax receipts for forest-dependent businesses, and information regarding tourism trends).</p> <p><b>Frequency reported:</b> 2 years and 6 years (recreation visitation per NVUM).</p>	Consider reprioritizing available resources, including leveraging partners, to respond to trends in the economic contribution of various authorized activities.

**Table 28. Monitoring questions, indicators, measures, and adaptive management actions for select range and timber plan components**

[FACTS, Forest Activity Tracking System; FIA, Forest Inventory and Analysis program; IMPLAN, IMpact analysis for PLANning; NVUM, National Visitor Use Monitoring program]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
5. What is the status and trend of the contribution of forest goods and services to economic activity in the local area? (vii)	FW-DC-RNG-01	Economic contribution (in terms of employment, labor income, and value added) to the local area associated with forage on the GMUG – including permitted livestock grazing and big game hunting	<b>Data source:</b> Regional Office <a href="#">IMPLAN</a> analysis Permitted and authorized animal use months Annual big game hunting licenses; outfitter days in the GMUG (per Colorado Parks and Wildlife). Additional data sources for question 5 could include county-provided information <b>Frequency reported:</b> 2 years and 6 years (recreation visitation per NVUM)	Consider reprioritizing available resources, including leveraging partners, to respond to trends in the economic contribution of permitted livestock grazing and big game hunting on the GMUG.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	FW-STND-TMBR-02	Seedlings and saplings per acre by ecosystem	<b>Data source:</b> FIA, FACTS (natural regeneration stocking survey data, planting survival rates) <b>Frequency reported:</b> 10 years	Planting survival and trends in regeneration on FIA plots informs species selection for seedling planting projects.
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	FW-DC-RNG-01	Range condition and trend	<b>Data source:</b> GIS updated with field data <b>Frequency reported:</b> 10 years	Decreasing trends could trigger change in livestock numbers, class, or season of use.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
7. What is the status and trend of terrestrial ecosystem integrity in the GMUG? (ii, viii, vii)	<b>FW-OBJ-RNG-03</b>	Percent of allotments evaluated annually  Description of adjustments made to respond to changing ecological conditions or resource concerns	<b>Data source:</b> field data  <b>Frequency reported:</b> 2 years	<i>(This is a reporting measure to track extent of allotment management evaluations and grazing adjustments. This indicator can inform adaptive management actions to support associated desired ecological conditions.)</i>

**Table 29. Monitoring questions, indicators, measures, and adaptive management actions for select trails plan components**

[NVUM, National Visitor Use Monitoring]

Monitoring Question (and associated requirement)	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
2. What is the status and trend of roads and trails in the GMUG? (v)	<b>FW-OBJ-TRLS-02</b>	Miles of National Forest System roads and trails: (1) open year-round or seasonally; (2) built and decommissioned; (3) maintained by maintenance level; and (4) maintained or improved to standard.  Public use of roads and trails.	<b>Data source:</b> Forest Service INFRA database, NVUM  <b>Frequency reported:</b> 2 years	Consider NVUM data to prioritize trail maintenance.

**Table 30. Monitoring questions, indicators, measures, and adaptive management actions for selected recreation plan components**

[NVUM, National Visitor Use Monitoring]

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
1. How is the public using the GMUG, what activities are people participating in, and what is the current satisfaction level of the recreational benefits and facilities provided? (v)	FW-DC-REC-01	Visitation in the GMUG: Percent satisfaction for "very satisfied," "somewhat satisfied," and "total satisfaction."	<b>Data source:</b> NVUM; augmented by more detailed data from partners as available ( <i>e.g., see also indicators regarding hunting/fishing for question 3</i> ). <b>Frequency reported:</b> 6- and 10-year reports.	Modify or improve recreation opportunity spectrum (ROS) settings and/or facilities based on needs identified by the public regarding recreation opportunities and experiences in the GMUG. The Forest Service defines a recreation opportunity setting as the combination of physical, biological, social, and managerial conditions that give value to a place.

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
3. Are the biophysical and/or social impacts associated with dispersed camping activity sustainable with the current use levels? (v)	<b>FW-STND-REC-08</b> <b>FW-DC-REC-01</b> <b>FW-DC-REC-02</b> <b>MA-OBJ-EMREC-02</b>	<p>a. Multiple sites (within a cluster of 15 or more campsites) with an overall impact rating of 6, 7, or 8. Measured at the scale of a drainage or localized geographic area such as a forest road or lake. Multiple sites within a cluster of campsites is defined as 'two or more campsites.' Individual campsites not located in clusters should be monitored where moderate to high use is known or anticipated, and/or are located in more susceptible ecosystems.</p> <p>b. Number of complaints, number of (verified) negative social media posts or web reviews, number of human-wildlife conflicts, extent of denuded ground cover, sanitation issues (fecal coliform), safety issues, and use conflicts.</p>	<p><b>a. Data source:</b> National Minimum Recreation Site Monitoring. [Overall impact rating = sum of ratings for (1) ground cover, (2) tree damage, and (3) disturbed area.]</p> <p><b>Frequency reported:</b> 2 years</p> <p><b>b. Data source:</b> Forest Service law enforcement and investigations reports, public affairs reports, water quality reports, public concerns filed by supervisor and district offices</p> <p><b>Frequency reported:</b> 2 years</p>	<p>Track indicators and evaluate possible adaptive management actions (potential management actions suggested in FW-STND-REC-07 and FW-STND-REC-08), including but not limited to:</p> <p>Designate dispersed campsites, prohibit camping via closure order, temporarily close and rehabilitate the sites, harden for more long-term and concentrated use, establish stay limits and/or a permit, fee, or reservation system. Consider implementing management actions through partnership efforts and investments as appropriate.</p>

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
12. Recreation - In areas where the existing recreation opportunity spectrum (ROS) is departed from the desired existing recreation opportunity spectrum, is the GMUG moving toward the desired existing recreation opportunity spectrum? (v)	<b>FW-GDL-REC-16</b>	Management actions or activities that move an area toward desired existing recreation opportunity spectrum class characteristics.	<b>Data source:</b> GMUG National Forests project reporting <b>Frequency reported:</b> 2 years	Assess activities taken to move toward desired existing recreation opportunity spectrum (ROS) and evaluate effectiveness of those actions.

**Table 31. Monitoring questions, indicators, measures, and adaptive management actions for selected wilderness plan components**

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
<p>3. Are the biophysical and/or social impacts associated with dispersed camping activity sustainable with the current use levels?</p> <p>(v)</p>	<b>MA-WLDN-GDL-10</b>	<p>a. Multiple sites (within a cluster of 15 or more campsites) with an overall impact rating of 6, 7, or 8. Measured at the scale of a drainage or localized geographic area such as a forest road or lake. Multiple sites within a cluster of campsites is defined as 'two or more campsites.' Individual campsites not located in clusters should be monitored where moderate to high use is known or anticipated, and/or are located in more susceptible ecosystems.</p> <p>b. Number of complaints, number of (verified) negative social media posts/web reviews, number of human-wildlife conflicts, extent of denuded ground cover, sanitation issues (fecal coliform), safety issues, and use conflicts.</p>	<p><b>a. Data source:</b> National Minimum Recreation Site Monitoring. [Overall impact rating = sum of ratings for (1) ground cover, (2) tree damage, and (3) disturbed area.]</p> <p><b>Frequency reported:</b> 2 years</p> <p><b>b. Data source:</b> Forest Service law enforcement and investigations reports, public affairs reports, water quality reports, and public concerns filed by supervisor and district offices.</p> <p><b>Frequency reported:</b> 2 years</p>	<p>Track indicators and evaluate possible adaptive management actions (potential management actions suggested in FW-STND-REC-07 and FW-STND-REC-08 that are consistent with management of congressionally designated wilderness and recommended wilderness).</p>



Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Source and Frequency of Collection	Adaptive Management Actions
4. What is the status and trend of wilderness character in designated wilderness areas, and wilderness characteristics in any working administrative recommended wilderness areas? (v)	<b>MA-DC-WLDN-01</b> <b>MA-GDL-WLDN-11</b> <b>MA-DC-RECWL-01</b>	a. Trends of wilderness character in congressionally designated wilderness areas per the five qualities: untrammeled, natural, undeveloped, solitude or primitive and unconfined recreation, and other features of value b. In administratively recommended wilderness (MA 1.2), trends of the social and ecological characteristics that provide the basis for wilderness recommendation as per indicators, measures, and measure type described in the <i>Wilderness Character Monitoring Technical Guide</i> and discussed in the <i>Wilderness Stewardship Performance Guidebook</i> .	<b>Data source:</b> Wilderness stewardship performance; wilderness character monitoring <b>Frequency reported:</b> 2-year (wilderness stewardship performance); 5-year (wilderness stewardship performance and wilderness character) reports.	Evidence of declining trends in wilderness character (congressionally designated wilderness areas) or wilderness characteristics (administratively recommended wilderness) could trigger actions to improve or restore conditions.  For example, if monitoring shows evidence of declining trends in naturalness or primitive and unconfined recreation due to impacts from dispersed camping, the following actions could be triggered: temporarily close and rehabilitate the sites, or establish stay limits and/or a permit, fee, or reservation system.

**Table 32. Monitoring questions, indicators, measures, and adaptive management actions for selected air quality plan components**

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Sources and Frequency of Collection (if known)	Adaptive Management Actions
What is the status of air quality and air quality-related values in Class 1, Sensitive Class II Wilderness Areas and the Class II area outside of the wilderness areas? (vi) ?	All air quality direction (AQ)	National Ambient Air Quality Standards, Limit of acceptable change for visibility, Critical loads for nitrogen and sulfur deposition, Mercury deposition, Lake acidification	<b>Colorado Air Quality Data Reports, Air Pollution Control Division (Annual)</b> <b>GMUG National Forests Critical Loads Summary (By Request)</b> prepared by the USDA Forest Service Northern Research Station <b>USEPA Clean Air Status and Trends Network (CASTNET) (Annual):</b> provides trends in pollutant concentrations, atmospheric deposition, and ecological effects due to changes in air pollutant emissions <b>Interagency Monitoring of Protected Visual Environments (IMPROVE) (Annual) Visibility Tools –</b> Analysis of haze trends and composition from the IMPROVE aerosol network	Determine if air quality affecting human health and the environment is improving, stable or deteriorating and if exceedances are occurring or if trends show exceedances could occur in the future.  Determine if the limit of acceptable change for

Monitoring Question	Selected Plan Components	Indicator(s) and Measure(s)	Data Sources and Frequency of Collection (if known)	Adaptive Management Actions
			<p><b>Ozone Tools</b> – Analysis of ozone trends as measured by the EPA ozone network</p> <p><b>Wet Dep Tools</b> – Analysis of wet deposition data from the NADP National Trends Network (NTN)</p> <p><b>Dry Dep Tools</b> – Analysis of dry deposition from the Clean Air Status and Trends Network</p> <p><b>National Atmospheric Deposition Program (NDAP) (Annual):</b> NADP is composed of four networks, including the National Trends Network (NTN) provides a long-term record of precipitation chemistry across the United States</p> <p><b>Mercury Deposition Network (MDN)</b> provides a long-term record of total mercury (Hg) concentration and deposition in precipitation in the United States</p> <p><b>Atmospheric Mercury Network (AMNet)</b> provides measurements of atmospheric mercury fractions which contribute to dry and total mercury deposition</p> <p><b>Mercury Litterfall Network (MLN)</b> provides measurements estimate of mercury dry deposition to a forested landscape</p> <p><b>Ammonia Monitoring Network (AMoN)</b> provides monitoring in the U.S. that measures ambient ammonia gas (NH<sub>3</sub>)</p> <p><b>USFS Ozone Monitoring Network</b></p> <p><b>USGS Snowpack monitoring network</b></p> <p><b>USFS long-term lake monitoring network</b></p>	<p>visibility, critical loads for nitrogen and sulfur deposition, mercury deposition and lake acidification are improving, stable or deteriorating and if exceedances of critical loads or thresholds are occurring or if trends show exceedances could occur in the future.</p> <p>Consider modifications to air quality plan direction if GMUG-authorized activities are analyzed to be a contributing factor.</p>

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## **Acronyms and Abbreviations**

Acronyms and abbreviations used in this document are as follows:

### **Plan Component Acronyms**

ATI – Areas of Tribal Importance  
AQ – Air quality  
AQTC – Aquatic ecosystems  
CCC – Climate change and carbon  
CHR – Cultural and historic resources  
CRA – Colorado roadless area  
DC – Desired conditions  
DTRL – Designated trails  
ECO – Key ecosystem characteristics  
EMREC – Recreation emphasis area  
ENMI – Energy and mineral resources  
FFM – Fire and fuels management  
FW – Forestwide  
GA – Geographic area  
GDL – Guideline  
IND – Monitoring indicator  
INFR – Infrastructure  
IVSP – Invasive species  
LSU – Lands and special uses  
MA – Management area or management approach, depending on context  
MON – Monitoring question  
MTR – Mountain resort  
OBJ – Objective  
PART – Partnerships and coordination  
PLEO – Paleontology  
REC – Recreation  
RECWLD – Recommended wilderness  
RMGD – Riparian and groundwater-dependent ecosystems  
RNA – Research natural area  
RNG – Range  
SBWY – Scenic byway  
SCEC – Socioeconomics  
SCNY – Scenery  
SIA – Special interest area  
SMA – Special management area

SPEC – Species  
STND – Standard  
SUIT – Suitability  
TABROU – Tabeguache and Roubideau Areas  
TMBR – Timber  
TSTN – Transportation  
UC – Utility corridor  
WLDF – Wildlife  
WLDN – Wilderness  
WSR – Eligible wild and scenic river  
WTR – Watershed

## **Other Acronyms and Abbreviations**

CCF – One hundred cubic feet  
CFR – Code of Federal Regulations  
DBH – Diameter at breast height  
FEIS – Final Environmental Impact Statement  
FSH – Forest Service Handbook  
FSM – Forest Service Manual  
GIS – Geographic information system  
GMUG – Grand Mesa, Uncompahgre, and Gunnison National Forests  
HUC – Hydrologic unit code  
MBF – One thousand board feet  
USDA – U.S. Department of Agriculture  
USDI – U.S. Department of Interior

## Glossary

### A

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#### **Access**

Road or trail route over which a public agency claims a right-of-way for public use; a way of approach.

#### **Adaptive management**

An approach to natural resource management where actions are designed and executed and effects are monitored for the purpose of learning and adjusting future management actions, which improves the efficiency and responsiveness of management.

#### **Administrative route**

A system route only open for administrative use, not the general public. *See system route.*

#### **Administratively designated trail**

The National Trails System Act of 1968 authorized creation of a national trail system consisting of national scenic, historic, and recreation trails. National recreation trails are administratively designated by the Secretary of Interior or the Secretary of Agriculture. *See also congressionally designated trail.*

#### **Age class**

Age class is one of the intervals, commonly 10 years, into which the age range of trees is divided for classification or use. Age class distribution refers to the location and/or proportionate representation of different age classes in a forest.

#### **Air quality: Class I, II, and III areas**

The area classification scheme established by Congress to facilitate implementation of the prevention of significant deterioration of the air quality provisions of the Clean Air Act.

**Class I** areas receive the highest degree of protection, with only a small amount of certain kinds of additional air pollution allowed.

**Mandatory class I** areas were designated by Congress and include international parks, national wilderness areas or national memorial parks larger than 5,000 acres, or national parks larger than 6,000 acres, that were in existence (or authorized) on August 7, 1977. The 1990 amendments to the Clean Air Act specified that acreage added to these areas after 1977 must also receive class I designation. Mandatory class I areas may not be redesignated to any other classification.

Congress initially designated all other attainment areas as **Class II** and allowed a moderate increase in certain air pollutants.

No **class III areas**, where a large amount of new air pollution would be allowed, were designated by Congress, but a process was established for redesignating Class II areas to the more protective class I or the less protective class III status. Only states or Native American governing bodies have authority to redesignate these areas, except as noted above.

### **Air quality related value**

Resource that may be adversely affected by a change in air quality. The resource may include visibility or a specific scenic, cultural, physical, biological, ecological, or recreational resource identified for a particular area. Values are specific for each congressionally designated wilderness area. The air quality related value, or part thereof, that is the most responsive to, or the most easily affected by the type of air pollution in question, is known as a sensitive air pollution receptor. Resource concern thresholds are established for these air quality related values/sensitive receptors. See the [Forest Service Wilderness Air Quality Monitoring](#) web page for more information.

### **Assessment**

For the purposes of land management planning at 36 CFR 219, an assessment is the identification and evaluation of existing information to support land management planning. Assessments are not decision-making documents, but provide current information on select topics relevant to the plan area in the context of their borders.

### **At-risk species**

A term used to collectively refer to the federally listed threatened, endangered, proposed, and candidate species as well as species on the regional forester's list of Species of Conservation Concern within the plan area.

### **Aquatic ecosystem**

The stream channel, lake or estuary bed, water, and biotic communities and the habitat features that occur therein. (FSM 2526)

## **B**

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### **Bark beetle**

Bark beetles are members of the family Curculionidae, subfamily Scolytinae whose adults and larvae tunnel in the cambium region (bark and sapwood) of living, dying, and recently dead or felled trees.

### **Bankfull width**

The measurement of the lateral extent of the water surface elevation that is perpendicular to the channel at bankfull depth. In general, channel width at bankfull discharge/flow.

### **Barrier**

The National Wildfire Coordination Group defines barrier as an obstruction to the spread of fire, typically an area or strip devoid of combustible fuel. Barriers, often called fuel breaks, may be natural or constructed, and may be used to stop or check fires that may occur or to provide a control line from which to work. A stream or rocky area might be considered a natural barrier, while examples of constructed barriers may include trails, agricultural fields, and constructed fire lines.

### **Basal area**

The cross-sectional area, in square feet, of a tree measured at breast height (4.5 feet). Basal area of an area is generally estimated in terms of square feet per acre.

**Best management practice**

A method or technique that has been determined to be the most effective and practical means of achieving an objective while making the optimum use of resources.

**Bicycle**

A device propelled solely by human power upon which a person or persons may ride on land, having one, two, or more wheels, except a manual wheelchair.

**Big game**

Those species of large mammals normally managed for sport hunting, generally including antelope, bighorn sheep, deer, elk, moose, and mountain goat.

**Biological diversity, or biodiversity**

The full variety of life in an area, including the ecosystem, plant, and animal communities, species and genes, and the processes through which individual organisms interact with one another and with their environment.

**Biotic**

Typically refers to living organisms in their ecological rather than their physiological relations.

**Browse**

The buds, shoots, and leaves of woody plants eaten by livestock or wild animals.

## C

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**Canada lynx**

The Canada lynx (*Lynx canadensis*) is a North American mammal of the cat family, Felidae, which ranges across Canada and into Alaska as well as some parts of the northern United States, including Colorado.

**Candidate species**

For species under the purview of the U.S. Fish and Wildlife Service, a species for which the agency possesses sufficient information on vulnerability and threat to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published.

**Canopy**

The uppermost spreading, branchy layer of a forest.

**Canopy cover**

The proportion of ground or water covered by the vertical projection of the outermost perimeter of the natural spread of foliage or plants.

**Capability**

The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends on current management practices at a given level of management intensity. It is also dependent on existing resource and site conditions such as climate, slope, landform, soil, and geology, as well as the application of management practices, such as silviculture or the protection from fire, insects, and disease.

### **Carr**

A type of waterlogged wooded terrain that typically represents a successional stage between swamp and the eventual formation of forest. Characteristic trees include alder and willow.

### **Carrying capacity**

The average number of livestock and/or wildlife that may be sustained on a management unit compatible with management objectives for the unit. In addition to site characteristics, it is a function of management goals and management intensity (Society for Range Management. 1998. Glossary of terms used in range management, fourth edition. Edited by the Glossary Update Task Group, Thomas E. Bedell, Chairman. Used with permission). The amount of forage produced annually in a management unit is only one attribute used to determine carrying capacity. The forage also has to be available to the animals. On many rangelands, the carrying capacity may be less than forage production would indicate because parts of the management unit are inaccessible to grazing animals. In essence, forage is present but unavailable. (Society for Range Management. 1998).

### **Channel**

A passage, either naturally or artificially created, that periodically or continuously contains moving water, or that forms a connecting link between two bodies of water. River, creek, run, branch, and tributary are some of the terms used to describe natural channels, which may be single or braided. Canal and floodway are some of the terms used to describe artificial channels.

### **Clearcut**

1. A stand in which essentially all trees have been removed in one operation to produce an even-aged stand. Depending on management objectives, a clearcut may or may not have reserve trees left to attain goals other than regeneration (*see regeneration method two-aged methods*).
2. A regeneration or harvest method that removes essentially all trees in a stand. A minor live component of the stand may be retained for purposes other than regeneration. The retained trees, referred to as leave trees, should generally comprise less than 10 percent of the growing space of the stand.

### **Climax**

The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

### **Coarse woody debris**

Coarse woody debris consists of any woody material greater than 3 inches in diameter and is derived from tree limbs, boles, roots, and large wood fragments and fallen trees in various stages of decay. Provides living spaces for a host of organisms and serves as long-term storage sites for moisture, nutrients, and energy.

### **Code of Federal Regulations (CFR)**

The listing of various regulations pertaining to management and administration of national forests and other Federal lands.

### **Collaboration**

Working with someone to produce or create something.



### **Commercial thinning**

An intermediate harvest of commercial-sized trees to meet a variety of management objectives including reducing stand density to improve tree growth, improving forest health, or to meet other stand structural or composition objectives.

### **Concern level 1**

A scenery management system term, these areas generally include all visible areas from primary travel routes, use areas, and water bodies where there is high public interest in the area's scenic qualities.

### **Congressionally designated trail**

The National Trails System Act of 1968 authorized creation of a national trail system consisting of national scenic, historic, and recreation trails. National scenic and national historic trails may only be designated by an act of Congress. *See also administratively designated trail.*

### **Connectivity**

Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to fluctuations in climate.

### **Conservation watershed network**

A specific set of subwatersheds (12-digit hydrologic unit codes) where prioritization for long-term conservation and preservation of Colorado River cutthroat trout and western toad (previously named the "boreal toad") occurs, specifically in areas where either non-native species are absent and/or where these native species (cutthroat trout and western toad (previously named the "boreal toad")) are self-sustaining. Evaluation of management activities in conservation watershed networks will follow appropriate levels of review prior to resource management.

### **Constraint**

A qualification of the minimum or maximum amount of an output or cost that could be produced or incurred in a given time period.

### **Construction**

The displacement of vegetation, soil, rock, and the installation of infrastructure involved in the process of building a complete, permanent road facility. The activities occur at a location or corridor that is not currently occupied by a road.

### **Coppice (Coppice with standards)**

Coppice is a vegetation reproduction method with clear felling or clearcutting. Clear felling stimulates sprouting from the residual roots. Standards are selected overstory trees reserved for a longer rotation at the time each crop of coppice material is cut.

### **Corridor (utility or right-of-way)**

A linear strip of land defined for the present or future location of transportation or utility right-of-way within its boundaries.

### **Council on Environmental Quality**

An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effects on the environment, conducts environmental studies, and advises the President on environmental matters.

### **Cover type**

The dominant vegetation in an area—for example, aspen, ponderosa pine, or sedges.

### **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 under the Endangered Species Act, on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require species management considerations or protection; and (2) specific areas outside of the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such area are essential for the conservation of the species. Critical habitat is designated through rule making by the Secretary of the Interior or Commerce.

### **Crown**

The upper part of a tree or other woody plant carrying the main branch system and foliage.

### **Culmination of mean annual increment**

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

### **Cultural landscape**

Cultural resources that represent the combined works of nature and humans.

### **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 Heritage Program is responsible, from artifacts to cultural landscapes, without regard to eligibility for listing on the National Register of Historic Places.

### **Culturally modified tree**

Bark-peeled trees and other trees with scientifically and culturally recognized modifications, such as axe-cuts/blazes, axe-cut delimbing and wood removal, and arborglyphs (aspen trees with historical inscriptions). These authentic Culturally Modified Trees (CMTs) are all considered significant cultural resources important to our understanding of Colorado history, prehistory, and archaeology.

## D

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### **Decadence**

A process, condition, or period of deterioration or decline.

### **Deciduous**

A deciduous tree or shrub sheds its leaves annually.

### **Decommission**

Demolition, dismantling, removal, obliteration, and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Decommissioning roads includes activities that result in the stabilization and restoration of unneeded roads to a more natural state.

### **Degradation**

To wear down by erosion, especially through stream action.

### **Demand**

The amount of an output that users are willing to take at a specified price, time period, and condition of sale.

### **Designated campsite**

A site designated and signed by the Forest Service for the purpose of overnight camping. These sites typically do not include amenities as developed campsites do, but are designated to concentrate use.

### **Designated road, trail, or area**

A National Forest System road, National Forest System trail, or area on National Forest System lands designated for motor vehicle use and displayed on a motor vehicle use map. *See also congressionally designated trail and administratively designated trail.*

### **Congressionally designated wilderness**

Congressionally designated wilderness refers to any area of land designated by Congress as part of the National Wilderness Preservation System that was established by the Wilderness Act of 1964.

### **Desired condition**

A description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. (36 CFR 219.7(e)(1)(i))

### **Developed recreation**

Recreation that occurs at constructed developments such as campgrounds, picnic grounds, resorts, ski areas, and trailheads. Facilities might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings. Campgrounds and picnic areas are examples of developed recreation sites.

### **Developed site**

Developed recreation sites are relatively small, distinctly defined areas where facilities are provided for concentrated public use, such as campgrounds and picnic areas.

**Diameter at breast height (DBH)**

The diameter of a standing tree measured at a point 4 feet 6 inches from ground level on the uphill side.

**Directional trail (one-way)**

A trail layout that encourages all recreationists to travel in one direction.

**Dispersed recreation**

Outdoor recreation that is spread out over the land and in conjunction with roads, trails, and undeveloped waterways. Activities are typically day-use oriented and include hunting, fishing, boating, hiking, off-road vehicle use, cross-country skiing, motorbiking, and mountain climbing.

**Disturbance**

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.

**Diversity**

The distribution and abundance of different plant and animal communities and species within an area. This term is not synonymous with “biological diversity.”

**Down or downed**

A tree or portion of a tree that is dead and lying on the ground.

**Downed woody material or debris**

Woody material, from any source, that is dead and lying on the forest floor.

## E

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**Easement**

A right afforded a person or agency to make limited use of another's real property for access or other purposes.

**Ecological conditions**

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

**Ecological integrity**

The quality or condition of an ecosystem when its dominant ecological characteristics (e.g., composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence.

### **Ecological process**

The actions or events that link organisms (including humans) and their environment, such as disturbance, successional development, nutrient cycling, carbon sequestration, productivity, and decay.

### **Ecological sustainability**

The maintenance or restoration of the composition, structure, and processes of ecosystems, including the diversity of plant and animal communities and the productive capacity of ecological systems (36 CFR 219.19).

### **Economic sustainability**

The capability of society to produce and consume or otherwise benefit from goods and services, including contributions to jobs and market and nonmarket benefits.

### **Ecosystem**

A spatially explicit, relatively homogenous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. Typically described in terms of its composition, structure, function, and connectivity. 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 downwoody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.

**Function.** Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.

**Connectivity.** (*see entry for connectivity above*).

### **Ecosystem services**

The direct and indirect contributions of ecosystems to human well-being. They directly or indirectly support survival and quality of life. Ecosystem services can be categorized into types:

**Provisioning services** – benefits obtained from ecosystems such as clean air, food, forage, fresh water, wood, fiber, genetic resources, and medicines.

**Regulating services** – benefits obtained from the regulation of ecosystem processes such as climate, natural hazards such as flood control, water purification, waste management, pollination, and pest control.

**Cultural services** – nonmaterial benefits that people obtain from ecosystems such as cultural heritage values, spiritual enrichment, intellectual development, recreation, and aesthetic values.

**Supporting services** – ecosystem services that are necessary for the production of all other ecosystem services. Examples include pollination, biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.

### **Ecotone**

The area where two ecosystems merge.

**Edge**

The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together.

**Effective ground cover**

Effective ground cover broadly includes duff, litter, live vegetation, and coarse and fine woody debris. It functions to protect topsoil from erosion and drought.

**Endangered species**

Any species that the Secretary of Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range.

**Endangered Species Act**

Public Law 93-205, approved in 1973 and since amended, the Endangered Species Act provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend.

**Environmental flow**

The quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic and riparian ecosystems that, in turn, support human cultures, economies, sustainable livelihoods, and well-being. (Arthington et al. 2018)

**Environmental impact statement**

A formal public document prepared to analyze the impacts on the environment of a proposed project or action and released for comment and review. It is prepared first in draft or review form and later in final form. An environmental impact statement must meet the requirements of the National Environmental Policy Act, the Council on Environmental Quality guidelines, and directives of the agency responsible for the proposed project. An impact statement includes the following points: 1) the environmental impact of the proposed action, 2) any adverse impacts that cannot be avoided by the action, 3) the alternative courses of actions, 4) the relationships between local short-term use of the human environment and the maintenance and enhancement of long-term productivity, and 5) a description of the irreversible and irretrievable commitment of resources, which would occur if the action were accomplished.

**Ephemeral stream/swale**

A geomorphic landscape feature that flows only briefly during and following a period of rainfall in the immediate locality.

**Erosion**

Detachment or movement of the land surface by water, wind, ice, gravity, or other geologic activity. Accelerated erosion is much more rapid than normal, natural, geologic erosion, primarily as a result of the influence of activities of man, animals, or natural catastrophes.

**Even-aged management**

The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and therefore, tree sizes throughout the forested area). The difference in age between trees forming the main canopy level of a stand generally does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested.

Clearcut, shelterwood, or seed-tree cutting methods produce even-aged stands (36 CFR 219.3).

### Executive order

An order of regulation issued by the President or some administrative authority under his or her direction.

## F

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### Facility

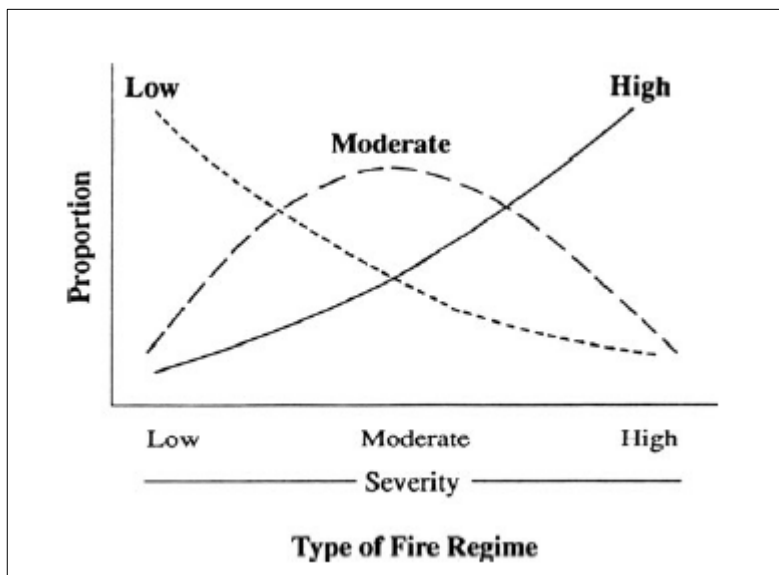
Structures needed to support the management, protection, and use of the national forests, including buildings, utility systems, dams, and other construction features. There are three types of facilities: recreation, administrative, and permittee.

### Fen

Wetlands that develop where a relatively constant supply of groundwater to the plant rooting zone maintains saturated conditions most of the time and the water chemistry reflects the mineralogy of the surrounding and underlying soils and geological materials (GDE Inventory Field Guide WO-86a).

### Fire regime

A description of historical fire conditions that influenced how vegetation communities evolved and were maintained over time, generally characterized by fire frequency (the average number of years between fires) and fire severity (the effect fire has on the dominant overstory vegetation). A given fire severity class is not characterized by the presence of only one kind of fire, but by the relative frequency of low, moderate, and high severity fire in an average burn (figure 4).



(Source: Agee 1993)

**Figure 4. Fire severity class is not characterized by the presence of only one kind of fire, but by the relative frequency of low, moderate, and high severity fire in an average burn**

**Floodplain**

The flat area of land adjacent to a river channel that is composed of unconsolidated sediments (alluvium) deposited when the river overflows its banks at flood stages.

**Focal species**

A small subset of species whose status infers the integrity of the large ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area.

**Forage**

Grasses, forbs, and shrubs; any plant material, mainly plant leaves and stems, eaten by grazers and browsers, including game species, non-game species, and livestock.

**Forest road or trail**

A road or trail wholly or partly within or adjacent to and serving the National Forest System that the U.S. Forest Service deems necessary for protection, administration, and use for the National Forest System and the use and development of its resources.

**Forb**

Any herbaceous flowering plant other than grasses.

**Foreground**

A term used in scenery management to describe the portions of a view between the observer and as far as one-quarter to one-half mile distant.

**Forest health**

The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, and vigor, presence of unusual levels of insects and diseases, and resilience to disturbance.

**Forest plan**

Source of management direction for an individual national forest that specifies activity and output levels for a period of time. Management direction in the plan is based on the issues identified at the time of the plan's development.

**Forest plan revision**

The process for revising a forest plan includes working identification of the need to change the plan based on the assessment, development of a proposed plan, consideration of the environmental effects of the proposal and preparation of a draft environmental impact statement, providing an opportunity for the public to comment on the proposed plan, providing an opportunity for the public to object before the proposal is approved, and finally, approval of the plan and preparation of the final environmental impact statement.

**Fragmentation**

A process that occurs wherever a large, contiguous habitat is transformed into smaller patches that are isolated from each other by a landscape matrix unlike the original. This matrix can differ from the original habitat in either composition or structure. The crucial point is that it functions as either a partial or total barrier to dispersal for species associated with the original habitat. A clear threat to population persistence occurs when fragmentation isolates pairs and populations, as opposed to fragmentation within the home range of individual pairs.



**Fuel**

Organic material that will support the start and spread of a fire: duff, litter, grass, weeds, forbs, brush, trees, and dead wood materials.

**Fuel load**

The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available (consumable) fuel or total fuel and is typically dry weight.

**Fuels management**

The manipulation of vegetation for the purpose of changing the characteristics of a fire as it burns.

**Fuels reduction treatment**

Manipulation or removal of fuels to lessen potential damage and resistance to control (includes mechanical and prescribed fire treatments). Fuels reduction treatments result in a change in the amount, configuration, and spacing of live and dead vegetation, with the purpose of creating conditions that result in more manageable fire behavior and reduced severity during wildland fires.

**Fuelwood**

Round, split, or sawed wood of general refuse material, which is cut into short lengths for burning as fuel.

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**G****Game species**

Any species of wildlife or fish for which hunting seasons and bag limits have been established, and are normally harvested by hunters and fishermen.

**General Mining Act of 1872**

Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the "general mining laws" or "mining laws."

**Geographic area**

A spatially contiguous land area identified within the planning area. A geographic area may overlap with management areas.

**Geographic information system (GIS)**

An information processing technology to input, store, manipulate, analyze, and display spatial resource data to support the decision-making processes of an organization. Generally, an electronic medium for processing map information.

**Geomorphic floodplain**

A suite of geomorphic surfaces created and shaped by fluvial processes by 'modern' climatic regime, in general this is a process-based definition area. A floodplain is a primarily flat area of land bordering a river that floods when the river is unusually high. If the area has flooded at least once during the last 100 years, it may be considered an active floodplain.

**Goal**

A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms, and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed. (36 CFR 219.3)

**Ground-based equipment**

Heavy machine equipment that is a tired or tracked vehicle (e.g., feller-buncher or skidder) that operates on the ground surface and is used for vegetation management, construction, or restoration work.

**Grass/forb**

An early forest successional stage during which grasses and forbs are the dominant vegetation.

**Groundwater**

All water below the ground surface, including water in the saturated and unsaturated zones. (USDA Forest Service General Technical Report WO-86a, 2012)

**Groundwater-dependent ecosystem**

Communities of plants, animals, and other organisms whose extent and life processes are dependent on access to or discharge of groundwater.

**Group selection**

A method of regenerating uneven-aged stands in which trees are cut, in small groups, and new age classes are established. The width of groups is commonly approximately twice the height of the mature trees, with small openings providing suitable microclimates for shade-tolerant tree species to regenerate, and the larger openings providing suitable microclimates for more shade-intolerant tree species to regenerate.

**Guideline**

A constraint on project or activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are intended to help achieve or maintain a desired condition or conditions, avoid or mitigate undesirable effects, or meet applicable legal requirements.

## H

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**Habitat**

The natural environment of a plant or animal. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

**Healthy ecosystem**

An ecosystem in which structure and functions allow the maintenance of biological diversity, biotic integrity, and ecological processes over time.

**Herbaceous**

Of, denoting, or relating to herbs.

**Hibernacula**

Habitat niches where certain animals (e.g., bats) over-winter, such as caves, mines, tree hollows, or loose bark.

**Hydrologic function**

Soil, stream, wetland and riparian area properties related to the storage, timing, distribution, and circulation of water.

**Hydrologic unit code (HUC)**

A unique numeric code that is used to identify watersheds in the United States for the purpose of providing a standardized base for use by water-resource organizations in locating, storing, retrieving, and exchanging hydrologic data (Seaber et al. 1987).

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**I****Ignition**

The initiation of combustion.

**IMPLAN**

Input-output modeling software used to estimate the economic contribution or impact associated with the production of goods and services.

**Indicator**

A measurable attribute of social and ecological conditions that is used to answer monitoring questions and evaluate progress toward maintaining or achieving desired conditions.

**INFRA**

INFRA is a collection of web-based data entry forms, reporting tools, and GIS tools that enable the Forest Service to manage and report accurate information about the inventory of constructed features and land units as well as the permits sold to the public and to partners.

**Infrastructure**

The facilities, utilities, and transportation system needed to meet public and administrative needs for operation (e.g., buildings, roads, and power supplies).

**Inholding**

Land within the proclaimed boundaries of a national forest that is owned by a private citizen, an organization, or an agency.

**In-Lieu Fee Program**

A program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for Department of the Army permits.

**Inner gorge**

That area beginning immediately adjacent to a stream channel below and extending upslope to the first break in the slope. It is also defined as a canyon created by a combination of the

downcutting action of a stream and mass movement on the slope walls; they commonly show evidence of recent movement. Such areas are concave in contour and/or profile.

### **Integrated pest management**

A pest 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 the decline in the desired conditions. 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. It is the planned and systematic use of detection, evaluation, and monitoring techniques, and all appropriate silvicultural, biological, chemical, genetic, and mechanical tactics needed to prevent or reduce pest-caused damage and losses to levels that are economically, environmentally, and aesthetically acceptable. *For more information about the Forest Service integrated pest management approach, see Forest Service Manual 2100, Chapter 2150, Pesticide-use management and coordination.*

### **Interdisciplinary team**

A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately solve the problem.

### **Intermittent stream**

A stream or reach of stream channel that flows, in its natural condition, only during certain times of the year or in several years. Characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments.

### **Interpretation**

Explaining the meaning or significance of something.

### **Invasive species**

**Native** species are those that have occurred, now occur, or may occur in a given area as a result of natural processes.

**Exotic** (a.k.a. non-native, foreign, or alien) species are those that live outside their native range and arrived there by human activity, either deliberate or accidental.

**Invasive** species have the ability to thrive and spread aggressively outside their natural range. They affect both aquatic and terrestrial areas and can be plants, vertebrates, invertebrates, and pathogens.

### **Invertebrate**

An animal lacking a spinal column.

### **Irretrievable**

Applies to losses of production, harvest, or uses of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost while an area is used as a road surface. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

## **Irreversible**

Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity. Irreversible also includes loss of future options.

## **K**

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### **Key area**

A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the range. Society for Range Management. 1998. Glossary of terms used in range management, fourth edition. Edited by the Glossary Update Task Group, Thomas E. Bedell, Chairman. Used with permission.

## **L**

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### **Land exchange**

The conveyance of non-Federal land or interests to the United States in exchange for National Forest System land or interests in land.

### **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.

### **Landscape scale**

A heterogeneous land area composed of a cluster of interacting ecosystems that are repeated in similar form throughout. Landscapes vary in size, from many thousands of acres to only a few kilometers in diameter.

### **Landslide**

The moderately rapid to rapid downslope movement of soil and rock that may or may not be saturated with water.

### **Late-successional forest**

A stage of forest succession where the majority of trees are mature or overmature.

### **Large woody debris**

Large pieces of relatively stable woody material located within the bankfull channel and appearing to influence bankfull flows.

**Single** – A single piece that has a length equal to or greater than 3 meters or two-thirds of the wetted stream width and 10 centimeters in diameter one-third of the way from the base.

**Aggregate** – Two or more clumped pieces, each of which qualifies as a single piece.

**Rootwad** – Rootmass or boles attached to a log less than 3 meters in length.

**Leasable mineral** – see *Mineral, leasable*.

**Leave tree**

A tree marked to be left standing in an area where it would otherwise be felled.

**Limits of acceptable change**

Limits of acceptable change within the context of air quality management are established by the Forest Service and indicate the amount of change that could occur without significantly altering an air quality related value and/or associated sensitive receptor. See the Forest Service [West Elk Wilderness](#) web page for more information.

**Linkage**

Broader regions of connectivity that are important to facilitate the movement of multiple species and maintain ecological processes.

**Litter**

A surface layer of loose organic debris, consisting of freshly fallen or slightly decomposed organic materials.

**Locatable mineral** – see *Mineral, locatable*.

**Lynx analysis unit**

An area of at least the size used by an individual lynx, from about 25 to 50 square miles.

## M

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**Maintained to standard (trails)**

Miles of National Forest System trail on which at least one maintenance task is performed to standard during the fiscal year. This measure includes annual maintenance and deferred maintenance (repair, replace, decommission). National Forest System [Trail National Quality Standards](#) are available online.

**Maintenance**

The upkeep of the entire Forest Development Transportation Facility, including surfaces and shoulders, parking and side areas, structures, and such traffic control devices as are necessary for its safe and efficient use (36 CFR 212.1). Maintenance is not for the purpose of upgrading a facility, but to bring it to the originally constructed or subsequently reconstructed conditions.

**Maintenance level**

*The level of service provided by, and maintenance required for, a specific road. For more information, see the entry for road maintenance level.*

**Management action**

An action humans impose on a landscape for the purpose of managing natural resources.

**Management approach**

Management approaches describe the principal strategies and program priorities the responsible official intends to employ to carry out projects and activities developed under the

plan. They can convey a sense of priority and focus among objectives and likely management emphasis. They are optional plan content.

**Management area**

A land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous.

**Management direction**

A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them. (36 CFR 219.3)

**Management prescription**

Management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives. (36 CFR 219.3)

**MBF**

One thousand board feet of timber.

**Mechanical treatment**

Mechanical vegetation treatment is any activity undertaken to modify the existing condition of the vegetation accomplished with mechanical equipment.

**Mechanized activity**

An activity that incorporates the use of mechanical means of assistance or transport. This includes, but is not limited to, non-motorized carts, wheelbarrows, bicycles, mountain bikes, unicycles, tricycles, skateboards, mountain boards, and unmanned aerial systems/drones (considered mechanized transport as well as aircraft).

**Memorandum of understanding**

A legal agreement between the Forest Service and other agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund-obligating document.

**Microequivalents per liter (µeq/L)**

One equivalent per liter is equal to one thousand milligram-equivalents per one thousand milliliters (meq/mL). Chemical analyses of solutes in a sample are expressed in unit concentrations that are chemically equivalent in terms of atomic or molecular weight and electrical charge.

**Migratory bird**

A bird that regularly crosses national borders as, for example, between breeding and wintering grounds.

**Mineral**

**Locatable** – Locatable minerals are minerals for which a statutory right exists to go onto public domain Federal lands open to mineral entry to stake ("locate") a mining claim for the purpose of mineral prospecting, exploration, development, and extraction as granted under the General Mining Act of 1872, as amended. All National Forest System lands classified as public domain lands are open to prospecting and developing locatable minerals unless they have been appropriated, withdrawn, or segregated from mineral location and entry (16 U.S.C. 482). Locatable minerals include metallic minerals, nonmetallic/industrial minerals,

and certain “uncommon variety” minerals having a unique or special quality giving it a higher value. Locatable metallic minerals include those minerals with a higher value including gold, silver, platinum, copper, lead, zinc, molybdenum, uranium, thorium, and tungsten. Locatable nonmetallic and/or industrial mineral resources include mineral commodities like fluorspar, mica, certain limestones and gypsum, tantalum, heavy minerals in placer form, and gemstones.

**Leasable** – Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920, as amended, or by other specific legislation. They include coal, phosphate, asphalt, sulfur, potassium, sodium minerals, and oil and gas, and hardrock minerals on acquired National Forest System lands. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

**Salable (or mineral materials)** – A collective term to describe common varieties of sand, gravel, stone, pumice, cinders, clay, and other similar materials. Common varieties do not include deposits of those materials that may be locatable. In general, these minerals are widely spread and are relatively low in unit value. They are generally used for construction materials and for road building purposes.

### **Mineral entry**

Claiming public lands administered by the Forest Service under the Mining Law of 1872 for the purpose of exploiting minerals. May also refer to mineral exploration and development under the mineral leasing laws and Material Sale Act of 1947.

### **Mineral lease**

A legal contract issued by the U.S. Department of Interior that conveys the right to explore for, develop and produce the specified mineral commodity for a specific period of time under certain agreed-upon terms and conditions.

### **Mining**

Extraction of valuable minerals or other geologic materials from the earth.

### **Mitigate, or mitigation**

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

### **Modification**

A description in scenic quality objectives when activities may dominate, but must use naturally established form, color, and texture. These areas should appear natural when viewed in the background.

### **Monitoring**

A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships.

### **Montane**

Of or inhabiting mountainous country.

### **Mosaic**

The intermingling of plant communities and their successional stages in such a manner as to give the impression of an interwoven design.



**Motor vehicle**

Any self-propelled vehicle other than a vehicle operated on rails or any wheelchair or mobility device, including battery-powered chairs, designed solely for use by a mobility-impaired person for locomotion and suitable for use in an indoor pedestrian area.

**Motor vehicle use map**

A map reflecting designated roads, trails, and areas on a National Forest System administrative unit or ranger district.

**Motorized activities**

Activities that incorporate the use of a motor, engine, or other non-living power source. This includes, but is not limited to, machines such as aircraft, hovercraft, motorboats, automobiles, motor bikes, electric-assist bikes, snowmobiles, snow bikes, bulldozers, chainsaws, rock drills, and generators.

**Motorized equipment**

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

**Motorized use**

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

**Multiple use**

The management of all the various renewable surface resources of the national forests so that they are used 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 the use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output. (36 CFR 219.19)

## **N**

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**National Environmental Policy Act**

A 1969 act declaring a national policy that encourages productive and enjoyable harmony between humankind and the environment, to promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality. (The Principal Laws Relating to Forest Service Activities, Agriculture Handbook No. 453, USDA Forest Service, 359 pp.) The National Environmental Policy Act process is an interdisciplinary process that concentrates decision-making around issues, concerns, alternatives, and the effects of alternatives on the

environment. National Environmental Policy Act regulations are set out in Forest Service Handbook 1909.15.

### **National Forest Management Act**

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of regional guides and forest plans, and the preparation of regulations to guide that development.

### **National Forest System lands**

All national forest lands reserved or withdrawn from the public domain of the United States, all national forest lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 USC 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system. 16 USC 1609(a).

### **National Forest System road**

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.

### **National Forest System trail**

A forest trail other than a trail that has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority. *See also congressionally designated trail and administratively designated trail.*

### **National Historic Preservation Act**

Extends the policy in the Historic Sites Act to State and local historical sites as well as those of national significance, expands the National Register of Historic Places, establishes the Advisory Council on Historic Preservation and the State Historic Preservation Officers, and requires agencies to designate Federal Preservation Officers. Section 106 directs all Federal agencies to consider the effects of their undertakings (actions, financial support, and authorizations) on historic properties included in or eligible for the National Register. Section 110 establishes inventory, nomination, protection, and preservation responsibilities for federally owned historic properties.

### **National minimum recreation site monitoring protocol**

This protocol provides a consistent process for monitoring recreation sites. The process calculates an overall impact rating for each site by assessing and tallying ratings for the following factors: (a) groundcover disturbance of the main campsite (1-4), (b) impact to standing trees and roots (1-2), and (c) the size of the disturbed area, including satellite tent pads and stock-holding areas (0-2). The sum of these ratings is the overall impact rating that ranges from 0 to 8. *See the following document: [Monitoring Procedures for the Recreation Sites Element of the Forest Service's Wilderness Stewardship Performance Minimum Recreation Site Monitoring Protocol](#).*

### **National Register of Historic Places**

The Nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archaeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture. The National Register is administered by the National Park Service.

### **National quality standard**

National quality standards define the corporate level of quality the Forest Service expects to provide the public at full service (forest plan) levels. Recreation site national quality standards are available online at

[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd627915.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd627915.pdf).

### **Native American Graves Protection and Repatriation Act (NAGPRA)**

Provides a process for museums and Federal agencies to return certain Native American cultural items—human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants, and culturally affiliated [Indian] Tribes and Native Hawaiian organizations. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional excavation, and unanticipated discovery of Native American cultural items on Federal and Tribal lands, and penalties for noncompliance and illegal trafficking. The Act requires agencies and museums to identify holdings of such remains and objects and to work with appropriate Native American groups toward their repatriation. Permits for the excavation and/or removal of “cultural items” protected by the Act require Tribal consultation, as do discoveries of “cultural items” made during activities on Federal or Tribal lands.

### **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 elicited 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.

### **Natural Resource Manager**

A system of database tools for managing agency data across the Forest Service and for most of the agency's natural resource business areas. Natural Resource Manager includes Forest Service ACTivity Tracking System (FACTS), Infrastructure (INFRA), Natural Resource Information System (NRIS), and Timber Information Manager (TIM) applications.

### **Non-motorized activities**

Activities that do not incorporate the use of a motor, engine, or other nonliving power source.

## **O**

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### **Objective**

A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets.

### **Old forest**

The overstory is dominated by late seral or climax species of a certain age and size, and has other characteristics such as snags, canopy layers, downed woody material, and trees with rotten, dead, or broken tops.

### **Opening**

Meadows, clearcuts, and other areas of vegetation that do not provide cover.

### **Oshá**

Oshá, also known as osha (*Ligusticum porteri*), is a perennial herb found in parts of the Rocky Mountains and northern Mexico, especially in the southwestern United States. Oshá is strictly a mountain plant that requires partial shade. It is most commonly found in deep, moist soils rich in organic material.

### **Output**

The goods, end products, or services that are purchased, consumed, or used directly by people. Goods, services, products, and concerns produced by activities that are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives.

### **Over-snow vehicle**

A motor vehicle designed for use over snow that runs on a track or tracks and/or a ski or skis while in use over snow.

### **Overlay**

Overlays are mapped and represent areas with more specific emphases and direction. These include scenic integrity objectives, desired recreation opportunity spectrum settings; designated trails; scenic byways; eligible wild and scenic river segments; and utility corridors. An example of this is the designated trails overlay, which includes the Continental Divide National Scenic Trail. While Continental Divide National Scenic Trail direction would apply along the entirety of the trail in the GMUG, how the corridor is managed would also be impacted by the underlying management area direction, which shifts as this trail traverses through several management areas, including Congressionally Designated Wilderness (MA 1.1), Colorado Roadless Areas (MA 3.1), Mountain Resorts (MA 4.1), and General Forest and Rangelands (MA 5). The most constraining standards, guidelines, and suitability determinations are applied when there are overlapping management areas and overlays.

### **Overstory**

That portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

## **P**

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### **Parallel system route**

Routes that run parallel to one another, typically jeep, all-terrain vehicle, or fire roads. Parallel routes allow for a variety of use types to occur side-by-side within a common corridor.

### **Party**

A group of people readily recognized as traveling together.

**Perennial stream**

A stream or reach of a channel that flows continuously or nearly so throughout the year and whose upper surface is generally lower than the top of the zone of saturation in areas adjacent to the stream.

**Planned ignition**

The intentional initiation of a wildland fire by a hand-held, mechanical, or aerial device where the distance and timing between ignition lines or points and the sequence of igniting them is determined by environmental conditions (weather, fuel, topography), firing technique, and other factors that influence fire behavior and fire effects (see prescribed fire).

**Planning period**

The lifetime of the plan. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits.

**Planning Rule**

The 2012 Planning Rule provides the overarching framework for individual forests and grasslands in the National Forest System to use in developing, amending, and revising land management plans, which are also known as forest plans. The planning rule identifies a framework for revising land management plans that consists of three phases: assessment, plan revision, and monitoring.

The Forest Service is required by statute to have a national planning rule: the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, requires the Secretary of Agriculture to issue regulations under the principles of the Multiple-Use Sustained-Yield Act of 1960 for the development and revision of land management plans.

**Plant community**

Any assemblage of plants that occur in the same area and form a distinct ecological unit.

**Precommercial thinning**

The selective felling, deadening, or removal of trees from a young stand maintaining a specific stocking or density stand management.

**Prescribed fire**

A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which National Environmental Policy Act requirements (where applicable) have been met prior to ignition (see planned ignition).

**Prescription**

A planned sequence of treatments designed to change current stand structures to one that meets management goals

**Primitive road**

A road constructed with no regard for grade control or designed drainage, sometimes by merely repeatedly driving over an area. These roads are of single lane, typically with native surfacing, and sometimes usable with 4-wheel-drive vehicles only.

**Priority watershed**

The 2012 Planning Rule requires land management plans to: (i) Identify watershed(s) that are a priority for maintenance or restoration; (36 CFR 219.7(f)(1)). Identification of priority

watersheds is done to focus effort on the integrated restoration of watershed conditions in these areas. Priority watersheds are those watersheds where plan objectives for restoration would concentrate on maintaining or improving watershed condition. However, selection of priority watersheds does not preclude watershed restoration efforts in other areas. The identification of priority watersheds is intended to be helpful to Forest Service managers as they schedule work after plan approval, especially in circumstances of limited budgets and resources. Changes as to which watersheds in the plan are “priority” are made by administrative change (sec. 21.5 of FSH 1909.12) (USDA Forest Service 2012).

**Productive**

The ability of an area to provide goods and services and sustain ecological values.

**Project record**

The documents and materials considered in the making of a forest plan, plan revision, or plan amendment. Also known as the planning record.

**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 for all 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. Projected timber sale quantity is not a target or a limitation on harvest and is not an objective unless the responsible official chooses to make it an objective in the plan (FSH 1909.12 CH 60.5).

**Projected wood sale quantity**

The estimated quantity of timber and all other woods products 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. The projected wood sale quantity includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. The projected wood sale quantity is also based on the planning unit’s fiscal capability and organizational capacity. Projected wood sale quantity is not a target or a limitation on harvest and is not an objective unless the responsible official chooses to make it an objective in the plan (FSH 1909.12 CH 60.5).

**Proper use**

A degree of utilization of current year's growth which, if continued, will achieve management objectives and maintain or improve the long-term productivity of the site. Proper use varies with time and systems of grazing. Synonyms: proper utilization, proper grazing use, allowable use (Society for Range Management, 1998).

**Proper use factor**

An index to the grazing use that may be made of specific forage species, based on a system of range management that will maintain the economically important forage species, or achieve other management objectives such as maintenance of watersheds and recreation values (Society for Range Management 1998).

**Proposed action**

In terms of the National Environmental Policy Act, the project, activity, or decision that a Federal agency intends to implement or undertake, which is the subject of an environmental impact statement or environmental assessment.

**Public access**

Generally refers to a road or trail route over which a public agency claims right-of-way for public use.

**Public participation**

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning.

## R

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**Range allotment**

Rangelands are managed as allotments and pastures. An allotment is a designated area of land available for permitted livestock grazing. Grazing is authorized for a specified number and kind of livestock. It is the basic land unit used to facilitate management of the range resource on National Forest System lands administered by the Forest Service.

**Range condition**

The state of the plant community on a range site in relation to the potential natural community or the desired plant community for that site. It is typically rated in the general category of satisfactory or unsatisfactory.

**Rangeland**

Land on which vegetation is predominantly grasses, forbs, or shrubs suitable for grazing or browsing. Rangeland may include some forest and barren land.

**Ranger district**

An administrative subdivision of a national forest that is supervised by a district ranger who reports to the forest supervisor.

**Reclamation**

Returning disturbed lands to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

**Reconstruction**

Activities performed on an existing road or other facility to restore it to a specified standard.

**Recreation opportunity spectrum**

Also known as recreation setting (see entry below). Allocations that identify a variety of recreation experience opportunities categorized into six classes on a scale from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

**Primitive** – Very high probability of experiencing solitude, self-reliance, and challenge; natural landscape with natural processes allowed to function; very low interaction between users; restrictions and controls not evident; access limited; generally cross-country travel.

**Semi-primitive non-motorized** – Good probability of experiencing solitude, self-reliance, and challenges; natural primitive landscapes; some evidence of users; minimum subtle controls; access by low standard trails and cross-country travel; natural processes allowed to function with subtle vegetative alterations. Managed for non-motorized use.

**Semi-primitive motorized** – Moderate probability for self-reliance and experiencing solitude away from travelways (roads/trails); risk associated with motorized equipment; predominantly natural landscapes; low concentration of users and interaction by users along travelways; minimum but subtle restrictions; vegetative alterations visually blend with the landscape. Existing routes are designated for off-highway vehicles and other high-clearance vehicles. Mountain bikes and other mechanized equipment are present.

**Roaded natural** – Low opportunity to avoid other users; little opportunity for risk or challenge; substantial modified landscapes; moderate evidence and interaction of users; controls and restrictions present; variety of motorized users and access; various shapes and sizes of vegetative alterations that blend with the landscape. The road system is well defined and can accommodate sedan travel.

**Rural** – Good opportunity to affiliate with others; facilities important; self-reliance of little importance; altered landscapes but attractive; high interaction among users; obvious and prevalent controls; extensive motorized use; vegetation maintained. Rural settings represent most developed recreation sites.

**Urban** – Opportunity to affiliate with others important; outdoor skills associated with competitive events; landscapes extensively changed with dominant structures; large numbers of user interactions; intensive controls are numerous; motorized use prevalent, including mass transit; vegetation planted and maintained. Highly developed ski areas and resorts are examples of a typical urban setting on National Forest System lands.

## Recreation setting

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

## Recreation site

A defined, public recreation area. The Forest Service uses two categories for recreation sites: dispersed and developed. Both types may have improvements needed to protect resources such as signs, road closure devices, bear resistant food storage devices, and/or sanitation facilities. Some recreation sites are designed and managed for overnight use, and some are designed and managed for day-use only (e.g., interpretive signs at roadside pullouts, trailheads at roadside pullouts or at road closures, picnic areas or boat launches that are closed at night, ski areas that do not have overnight lodging).

**Developed sites** have agency improvements made out of manmade materials that are intended to provide for public recreation and user comfort/convenience. Examples on National Forest Service lands include, but are not limited to, ski areas, campgrounds, sites with cabins, huts, lodges, recreation residences, visitor centers, and trailheads.

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

## Reforestation

Management activities used to increase or accelerate the establishment of forest cover to meet resource objectives.



## **Regeneration**

**Natural** – A group or stand of young trees created from germination of seeds from trees on the site or sprouting from trees on the site.

**Artificial** – A group or stand of young trees created by direct seeding or by planting seedlings or cuttings.

## **Regeneration harvest**

Timber harvest system intended to create a new age class (see regeneration method).

## **Regeneration method**

A cutting procedure by which a new age class is created. The major methods are clearcutting, seed-tree, shelterwood, selection, and coppice. Regeneration methods are grouped into four categories: coppice, even-aged, two-aged, and uneven-aged.

## **Region**

An administrative unit within the National Forest System based on geographical location. Each of the nine Forest Service regional offices is supervised by a regional forester. The Rio Grande National Forest is part of the Rocky Mountain Region, also known as Region 2. The Rocky Mountain Regional Office is strategically located in Lakewood, Colorado, between the foothills of the Rocky Mountains and downtown Denver.

## **Rehabilitation**

- 1) Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.
- 2) A short-term scenic condition objective used to restore landscapes containing undesirable visual or other resource impacts to the desired scenic or other acceptable quality level.

## **Research natural area**

Designated areas of land established by the Chief of the Forest Service under 36 CFR 251.23 for research and educational purposes and to typify important forest and range types of the national forest, as well as other plant communities that have special or unique characteristics of scientific interest and importance.

## **Resilience**

The ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape.

## **Resistance**

The capacity of ecosystems to tolerate disturbances without exhibiting significant change in structure and composition. The concepts of resistance and resilience are jointly referred to as resilience.

## **Responsible official**

The Forest Service employee who has the delegated authority to make a specific decision. For example, the regional forester will select the preferred alternative for the forest plan.

## Restore/restoration

Assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It is an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity, and sustainability.

## Revegetation

The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.

## Right-of-way

Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project or facility passing over, upon, under, or through such land (36 CFR 251.51). The privilege that one person or persons particularly described may have of passing over the land of another in some particular line (FSH 2709.12 05 10).

## Riparian area

A riparian ecosystem is a transition area between the aquatic ecosystem and the adjacent terrestrial ecosystem, identified by soil characteristics or distinctive vegetation communities that require free or unbound water (FS-990A). Riparian areas may be associated with lakes, reservoirs, estuaries, hot springs, marshes, streams, fens, wet meadows, and intermittent or permanent streams where free and unbound water is available. This habitat is transitional between true bottomland wetlands and upland terrestrial habitats, and while associated with watercourses, may extend inland or upland for considerable distances.

## Riparian management zone

Riparian management zones are delineated as follows per the revised plan standard FW-STND-RMGD-07 (Table 2 of revised plan).

Waterbody/Riparian Feature	Riparian Management Zone description
Perennial streams with native fish	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 300 feet from bankfull, either side.
Perennial streams (without native fish)	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 100 feet from bankfull, either side.
Intermittent streams	The riparian management zone consists of one of four criteria, whichever is greatest: the stream, extending from the edges of the stream to the 1) outer edge of the geomorphic floodplain (valley bottom); 2) outer edge of riparian vegetation; 3) top of any inner gorge or 4) 50 feet from bankfull, either side.

Waterbody/Riparian Feature	Riparian Management Zone description
Fen wetlands	<p>The riparian management zone is:</p> <ol style="list-style-type: none"> <li>1) 100-foot slope distance from the edge of the fen wetland; or</li> <li>2) if the zone of influence for a given fen has been determined to be a smaller OR larger distance, this would instead be delineated as the RMZ.</li> </ol> <p>The zone of influence for fen wetlands is defined as the area of groundwater influence that maintains the saturation conditions that inhibit the organic matter (peat) decomposition and allow the peat accumulation.</p> <p><i>See also plan appendix 12 for best available scientific information regarding buffers for fen wetlands.</i></p>
Non-fen wetlands, lakes, and seeps/springs	<p>The riparian management zone consists of one of three criteria, whichever is greatest: 1) the body of water or wetland to the outer edges of the riparian/wetland vegetation; 2) the extent of the seasonally saturated soil; or 3) 100-foot slope distance from the edge of the wetland/water feature OR, for constructed ponds and reservoirs with shorelines composed of riparian vegetation, the maximum pool elevation.</p>
Ephemeral streams and swales	<p>The riparian management zone is 25 feet from the edge of evidence of high-water flow potential for the stream/swale.</p>
Constructed ponds and reservoirs with riparian vegetation	<p>The riparian management zone is the maximum pool elevation.</p>

## Road

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

### Road maintenance level

Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (FSH 7709.58, section 12.3). More information is available online at [Guidelines for Road Maintenance Levels](#). The maintenance levels are:

**Maintenance level 1** – Intermittent service roads, also known as administrative use only roads. Not open to public motorized use. Basic custodial maintenance is performed.

**Maintenance level 2** – Roads open for public use by high-clearance vehicles, minor traffic, no warning signs. Passenger car traffic is not a consideration.

**Maintenance level 3** – Roads open for public use and maintained for a prudent driver in a standard passenger car, low speed travel, warning signs provided. User comfort and convenience are not considered priorities.

**Maintenance level 4** – Roads that provide a moderate degree of user comfort and convenience at moderate travel speeds, single or double lane, aggregate or paved surface.

**Maintenance level 5** – Roads that provide a high degree of user comfort and convenience, single or double lane, generally paved surface, or aggregate surfaced with dust abatement.

## **Rocky Mountain Region**

The Forest Service organizational unit consisting of Colorado, Wyoming, South Dakota, Nebraska, and Kansas. Also called Region 2.

## **Rotation**

The planned number of years between the formation of a generation of trees and its final cutting at a specified stage of maturity.

# **S**

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## **Sacred site**

Per Executive Order 13007 – any specific, discrete, narrowly delineated location on Federal land that is identified by an [Indian] Tribe, or [Indian] individual determined to be an appropriately authoritative representative of an [Indian] religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an [Indian] religion; provided that the [Indian] Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

## **Salvage harvest**

The removal of dead trees or trees damaged or dying because of injurious agents, other than competition, that recovers economic value that would otherwise be lost, or because the removal of the dead or damaged trees contributes to achieving plan desired conditions or objectives.

## **Sanitation harvest**

Intermediate harvest to remove trees to improve stand health by stopping or reducing the actual or anticipated spread of insects and diseases.

## **Sawtimber**

Larger diameter trees of sufficient size and quality to be manufactured into dimensional lumber products. Species and minimum diameters of sawtimber trees are established by regional timber markets.

## **Scale**

The degree of resolution at which ecological processes, structures, and changes across space and time are observed and measured.

## **Scenic character**

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

## **Scenic condition**

Measurable standard for scenic resource management based on the acceptable degree of alteration of the characteristic landscape. The acceptable degree of alternation for a given landscape is dictated by the area's scenic integrity objective.

### **Scenic integrity objective**

Scenic integrity objectives are the minimum degree to which desired scenic character attributes are to remain intact (Agriculture Handbook 701, page 20 and 5-9). Four nationally defined scenic integrity objectives serve as desired conditions, and one (very low) is used only in describing existing (not desired) conditions. Each is defined below.

**Very high** – The landscape is intact with only minor changes from the valued attributes described in the scenic character.

**High** – Management activities are unnoticeable, and the landscape character appears unaltered.

**Moderate** – Management activities are noticeable but are subordinate to the landscape character. The landscape appears slightly altered.

**Low** – The landscape appears altered. Management activities are evident and sometimes dominate but are designed to blend with surroundings by repeating form, line, color, and texture of attributes described in the scenic character.

**Very low** – Used to describe landscapes that are heavily altered and in which the valued attributes described in the scenic character are not evident. Very low is used only to describe the existing scenic integrity. It is **not** used as a scenic integrity objective or desired condition.

### **Scenic resource**

The composite of basic physiographic features, patterns, and land-use effects that typify a land unit and influence the scenic appeal the unit may have for visitors.

### **Secure habitat**

An area where wildlife retreat for safety when disturbance in their usual range is intensified, such as by logging activities or during hunting seasons.

### **Sedge**

A grass-like plant with triangular stems and inconspicuous flowers, typically growing in wet ground.

### **Sediment**

Material suspended in water or that has been deposited in streams and lakes.

### **Seedling/sapling**

A forest successional stage in which trees are less than 5 inches in diameter.

### **Seral**

The gradual supplanting of one community of plants by another, the sequence of communities being termed a sere and each stage seral (successional).

### **Seral stage**

A phase in the sequential development of a climax community.

### **Shrub/seedling**

A forest successional stage in which shrubs and seedling trees are the dominant vegetation.

### **Silviculture**

The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

### **Site capability (also known as ecological response unit)**

A unit of land that is homogenous in character such that similar units will respond in the same way to disturbance or manipulation. Syn. ecological site, ecological type. Society for Range Management. 1998. Glossary of terms used in range management, fourth edition. Edited by the Glossary Update Task Group, Thomas E. Bedell, Chairman. Used with permission.

### **Skidding**

Moving logs by sliding from stump to a collecting point.

### **Slope**

The amount or degree of deviation from the horizontal or vertical.

### **Slope stability**

The resistance of any inclined surface, as the wall of an open pit or cut, to failure by sliding or collapsing.

### **Snag**

A standing, dead tree.

### **Social sustainability**

The capability of society to support the network of relationships, traditions, culture, and activities that connects people to the land and to one another and supports vibrant communities.

### **Soil productivity**

The capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit, area/year, percentage of plant cover, or other measures of biomass accumulation.

### **Soil survey**

The systematic examination, description, classification, and mapping of soils in an area.

### **Spatial**

Referring to the distance, interval, or area between or within things.

### **Special area**

Area designated by law (by Congress) or statute or through administrative process (by the Secretary of Agriculture or a Forest Service official).

### **Special interest area**

A type of management area designated by the forest supervisor for scenic, geologic, botanic, zoologic, paleontological, archaeological, historic, scenic, or recreational values, or combinations of these values. A special interest area is a type of special area designated

through administrative process. Special interest areas are addressed in Forest Service Manuals 2360 and 2372.

**Special use authorization or permit**

A permit, term permit, lease, or easement that allows occupancy, use, rights, or privileges of National Forest System land.

**Species**

Organisms that successfully reproduce among themselves and cannot reproduce successfully with other organisms.

**Stacked loop**

A stacked loop trail system has several, interconnected looped trails. This design creates an efficient, compact layout with many route options accommodating a variety of ability levels (novice to expert). In a stacked loop system, each loop typically extends from a single trailhead.

**Stand**

A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities. In silviculture/vegetation management, a distinct silvicultural or management unit.

**Standards and guidelines**

**Standard** – a mandatory constraint on project and activity decision-making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. (36 CFR 219.7(e)(1)(iii))

**Guideline** – a constraint on project and activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. (36 CFR 219.7(e)(1)(iv))

Guidelines are similar to standards in that they are design criteria for projects and activities to help achieve the desired conditions and objectives, or at least to ensure that projects or activities do not foreclose their maintenance or attainment. Guidelines differ from standards in that they provide flexibility for compliance, while standards are concrete limitations.

**Stewardship**

Caring for the land and associated resources and passing healthy ecosystems to future generations.

**Stipulation**

A provision that modifies standard lease rights and is attached to and made a part of the lease.

**Stocking**

Live trees per acre needed to meet resource objectives as identified in the forest plan or through other management decisions.

**Structural stage**

Any of several developmental stages of tree stands described in terms of tree age or size and density. In general, the habitat structural stages developed by the Forest Service Rocky

Mountain Region staff are used. This classification has different structural stages based on tree size (diameter at breast height) and percentage of tree canopy cover.

**Structure**

The horizontal and vertical physical elements of forests and grasslands and the spatial interrelationships of ecosystems.

**Stubble**

The basal portion of plants remaining after the top portion has been harvested. Also, the portion of the plants, principally grasses, remaining after grazing is completed.

**Substrate**

The rock material varying in size from boulders to silt that is found in the bed of rivers and streams.

**Subwatershed**

Watershed designated at the HUC 12 (12-digit hydrologic unit code) level.

**Succession**

The sequential process of long-term plant community change and development that occurs following a disturbance.

**Successional stage (seral stage)**

The relatively transitory communities that replace one another during development to potential natural community.

**Suitable timber/Areas suitable for timber production**

Area that defines where timber harvest for the purpose of timber production may occur, subject to subsequent project-level, site-specific data, and analysis. This is a plan-level allocation decision. Timber harvest for purposes other than timber production may also occur here. Scheduled timber harvests occur on these lands, among other active management activities, to contribute to Forestwide desired conditions and multiple use goals.

**Suppression**

The work of extinguishing a fire or confining fire spread.

**Surface water**

Water on the surface of the earth.

**Surface-disturbing activities**

Surface-disturbing activities are those that normally result in more than negligible (immeasurable, not readily noticeable) disturbance to vegetation and soils and accelerate the natural erosive process. Surface disturbances could require reclamation and normally involve use and/or occupancy of the surface, causing disturbance to soils and vegetation. They include but are not limited to the use of mechanized earth-moving and logging equipment; off-road vehicle travel; construction of infrastructure such as recreation sites, communication sites and oil and gas wells and/or pads; new trail and temporary road and skid trail construction; and livestock trailing. Surface disturbance is not normally caused by casual-use activities. Activities that are not normally considered surface disturbing include but are not limited to: cross-country hiking and vehicular travel on designated routes.



## **Sustainability**

The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs.

## **Sustained yield**

The amount of renewable resources that can be produced continuously at a given intensity of management.

“Sustained yield of the several products and services” means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land. (36 CFR 219.3)

## **Sustained yield limit**

(FSH 1909.12 CH 60.5) – The amount of timber, meeting applicable utilization standards that can be removed from a forest annually in perpetuity on a sustained yield basis. It is the volume that could be produced in perpetuity on lands that may be suitable for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of sustained yield limit is not limited by land management plan desired condition, other plan components, or the planning unit’s fiscal capability and organizational capacity. The sustained yield limit is not a target but is a limitation on harvest, except when the plan allows for a departure.

## **System route**

A National Forest System route (road or trail) that is a designated route in the forest transportation system, managed to varying maintenance levels and types of use. May be administrative only or open to general public use. See administrative route.

# **T**

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## **Temporary road**

A road necessary for emergency operations or authorized by contract, permit, lease, or other written authorization. Temporary roads are not included in a national forest’s transportation atlas (per Subpart A of the Travel Management Rule, 36 CFR, Chapter II, Part II, 212.1).

## **Terra trail**

A trail that exists on the ground, as opposed to an over-snow trail.

## **Terrestrial ecosystem**

A plant community that is not dependent on a perpetual source of water to grow.

## **Thinning**

Intermediate treatment to reduce stand density or stocking levels to meet a variety of management objectives including increasing tree growth or vigor, improving stand health or species composition, reducing fuels, or improving wildlife habitat.

## **Threatened and endangered species**

An endangered species is a plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A

threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**Threshold**

The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

**Timber harvest**

The removal of trees for wood fiber utilization and other multiple-use purposes.

**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.

Managing land to provide commercial timber products on a regulated basis with planned, scheduled entries.

**Timber sale**

Selling of forest products with monetary value to meet forest plan objectives, including providing raw material for both commercial manufacturing and personal use.

**Trail**

A route 50 inches or less in width, or a route greater than 50 inches wide that is identified and managed as a trail.

**Trail class**

Trail classes are general categories reflecting trail development scale, arranged along a continuum. The trail class identified for a National Forest System trail prescribes its development scale, representing its intended design and management standards. The National Forest System [Trail Class Matrix](#) is available online.

**Trail vehicle**

A vehicle designed for trail use, such as bicycles, snowmobiles, trail bikes, trail scooters, and all-terrain vehicles.

**Travel management**

Providing for safe, environmentally responsible, and customer-responsive movement of vehicles and people to and through public lands. Travel management decisions are not made by this forest plan.

**Turbo fladry**

Turbo fladry is a relatively simple fencing tool designed to protect livestock from wolves, typically consisting of bright-red nylon flags that are sewn onto a long strand of woven plastic and metal wire that is capable of conducting an electrical current. This type of temporary electric fencing works because wolves are instinctively fearful of the motion of the flags and will receive a shock if they eventually become bold enough to approach and touch the electrified wire. When used correctly, turbo fladry is a highly effective tool for preventing wolf predation.

## U

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### **Understory**

That portion of a plant community growing underneath the taller plants on the site.

### **Uneven-aged management**

The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is typically regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single tree and group selection. (36 CFR 219.3)

### **Unmanned aircraft system**

An aircraft, and its associated elements (ground control links and communication units), that is operated remotely without direct human intervention from within or onboard. Unmanned aircraft systems are also known as drones. The Federal Aviation Administration and the U.S. Forest Service consider all unmanned aircraft systems, regardless of size or weight, to be aircraft. All unmanned aircraft systems flown from and above National Forest System lands must comply with Federal Aviation Administration and U.S. Forest Service laws, regulations, and policies. Members of the public may fly unmanned aircraft systems for recreational use in many places on National Forest System lands. However, there are areas on National Forest System lands where unmanned aircraft systems can't be flown as mandated by Federal law and in accordance with Federal Aviation Administration guidelines, such as congressionally designated wilderness areas. More information is available on the [Tips for Responsible Recreational Use of Unmanned Aircraft Systems \(UAS\) on National Forest System Lands webpage](#).

### **Unplanned ignition**

The initiation of a wildland fire by lightning or unauthorized or accidental human-caused fire (see wildland fire).

## V

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### **Vegetation management**

Activities designed primarily to promote the health of forest vegetation to achieve desired results. When vegetation is actively managed, it is manipulated or changed by humans to produce desired results. Where active management of vegetation is required, techniques are based on the latest scientific research and mimic natural processes as closely as possible. Vegetation management is the practice of manipulating the species mix, age, fuel load, and/or distribution of wildland plant communities within a prescribed or designated management area to achieve desired results.

### **Viable population**

A population of plants or animals large enough and distributed in such a way as to ensure its continued existence despite all the hazards to survival such as illness, predators, and old age throughout its existing range within the planning area.

## **Viewshed**

The visible portion of the landscape seen from viewpoints. Viewpoints can include residences, recreational facilities, and travelways.

# **W**

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## **Water right**

A property right granted by a State for the use of a portion of the public's surface water resource obtained under applicable legal procedures.

## **Weed management area**

A cooperatively identified area that facilitates land managers and owners to manage a common weed problem. The formation of a weed management area replaces jurisdictional boundaries that are barriers to weed management programs in favor of natural or more logical boundaries that facilitate weed management and control.

## **Watershed**

An area of land with a characteristic drainage network that contributes surface or groundwater to the flow at that point; a drainage basin or a major subdivision of a drainage basin.

## **Wetland**

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” (40 CFR 122. 2)

## **Wild, scenic, and recreational river**

A river or section of a river designated under the 1968 Wild and Scenic Rivers Act as wild, scenic, or recreational. Rivers may be designated by Congress or, if certain requirements are met, the Secretaries of Interior or Agriculture, as appropriate. Once designated under the Act, rivers receive special management direction that ensures the maintenance of the free-flowing nature and the outstanding natural, cultural, and recreational values of the river segment. Under the Act, river segments are required to be classified as wild, scenic, or recreational:

**Wild River** – 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** – 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** – 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.

## **Wilderness**

All lands included in the National Wilderness Preservation System by public law; generally defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation.

**Wildland fire**

A general term describing any nonstructural fire that occurs in the wildland. Wildland fires are categorized into two distinct types:

**Planned (Prescribed fires)** – (see prescribed fire definition).

**Unplanned** – (see unplanned fire definition).

**Wildland-urban interface**

The line, area, or zone where structures and other human developments meet or intermingle with undeveloped wildland or vegetation fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire ([2009 Guidance for Implementation of Federal Wildland Fire Management Policy and Fire Management Board Memorandum 19-004a](#)).

**Windthrow**

The act of trees being uprooted by the wind.

**Winter range**

An area used by deer and elk during the winter months, generally at lower elevations with south and west exposures.

**Withdrawal**

An action that restricts the use of public land and segregates the land from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other Federal agencies.

## Z

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**Zone of Influence (Fen Wetland)**

The zone of influence for fen wetlands is defined as the area of groundwater influence that maintains the saturation conditions that inhibit the organic matter (peat) decomposition and allow the peat accumulation.

## Appendix 1. Maps

The revised forest plan maps are available online in PDF format at:

<http://www.fs.usda.gov/goto/ForestPlan>. Available maps include:

- Management Area Allocations and Overlays
- Colorado Roadless Areas, including Upper Tier and non-Upper Tier classifications (*provided as reference, unaffected by revised forest plan*)
- Desired recreation opportunity spectrum (ROS) settings, summer and winter
- Desired scenic integrity objectives (SIOs)
- Areas suitable for timber production
- Coal Unsuitability Analysis: Areas determined to be 1) unsuitable or 2) potentially subject to surface use restrictions for coal leasing and/or surface operations incidental to underground coal mining on the GMUG
- Eligible Wild and Scenic River Corridors (detailed)

## Appendix 2. Proposed and Possible Actions

### Introduction

The 2012 Planning Rule requires the forest plan to include “information reflecting proposed and possible actions that may occur in 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...” (36 CFR 219.7). Accordingly, the following section details the projected vegetation management program and projected timber sale and wood sale quantities for the forest plan. The listed proposed and probable vegetation management practices are not intended to be all-inclusive, nor are they intended to be decisions or commitments, but simply projections of what actions may take place in the future. A plan amendment is not required to change or modify any proposed or possible actions.

All forest plan objectives are also consolidated in one table at the end of this appendix, as these are time-specific, measurable commitments designed to move the national forests toward desired conditions.

### Projected Vegetation Management

Forest management in the GMUG National Forests is motivated by, and designed to meet, desired conditions for resilient, climate-adapted ecosystems (*see forest plan desired conditions FW-DC-ECO-01, 02, 03, and FW-DC-FFM-01*). The GMUG partners with local stakeholders and the timber industry to work toward desired conditions for ecosystem integrity and climate change adaptation.

Climate change adaptation projects utilize one or more strategies from the “toolbox” approach to climate change adaptation, including 1) *resistance* (forestall impacts and protect highly valued resources), 2) *resilience* (improve the capacity of ecosystems to return to desired conditions after disturbance), and 3) *transition* (facilitate transition of ecosystems to new conditions) – commonly referred to as the “RRT” approach (Millar et al. (2007), Peterson et al. (2011), and Swanston et al. (2016). *See detailed management approach FW-MA-CCC-01 in the Climate Change and Carbon section of the forest plan.*

Specific objectives of vegetation management may include increasing ecosystem resilience to wildfire and other disturbances, restoration and improvement of watershed function and wildlife habitat, reduction of wildfire hazard to communities, and protection of critical infrastructure, particularly that which supports municipal and agricultural water supplies. However, we describe forest management (timber) treatments, fuels treatments, and wildlife habitat treatments separately below simply to avoid double or triple counting the same acreage, recognizing that treatments in one category often benefit others.

Forest management projects are projects that typically involve commercial timber harvest to make the management economically viable. These include timber harvest in lodgepole pine, spruce-fir, spruce-fir-aspen, mixed conifer, ponderosa pine, and aspen vegetation types in the GMUG, including salvage (in recent years, in spruce-fir impacted by the spruce beetle). A large proportion of the non-salvage program is expected to come from lodgepole pine in the years 2021–2024. Typical silvicultural system treatments for each vegetation type are outlined in table 34. These include even-aged management systems, such as clearcut and shelterwood harvests, as well as uneven-aged management systems, such as group selection and individual tree selection. These will be the primary methods used to meet the management objectives for the landscape or individual stands within a landscape setting. Intermediate treatments such as thinning, salvage, and improvement cuts

may be used. Management systems will be applied at scales ranging from a few acres to many hundreds of acres as appropriate. Timber management treatments are approved by certified silviculturists.

**Table 33. Typical silvicultural system treatments by vegetation type**

<b>Vegetation Type</b>	<b>Typical Silvicultural System<sup>3</sup> Treatments (Dominant Treatments are in Bold)</b>
Spruce-fir, spruce-fir-aspen	<b>Salvage, Group Selection</b> , Individual Tree Selection, Clearcut <sup>1</sup> , Thinning, Coppice/Clearcut with Reserves
Aspen	<b>Coppice/Clearcut<sup>2</sup></b> , Coppice/Clearcut with Reserves, Group Selection
Lodgepole Pine	<b>Clearcut</b> , Group Selection, Individual Tree Selection, Clearcut with Reserves
Mixed Conifer	<b>Individual Tree Selection</b> , Group Selection, Thinning, Shelterwood
Ponderosa Pine	<b>Individual Tree Selection</b> , Thinning

<sup>1</sup> For spruce-fir, clearcutting is acceptable, but not a standard practice.

<sup>2</sup> Clearcut if intent is to regenerate with conifer, coppice if the intent is to regenerate aspen.

<sup>3</sup> All types of silvicultural systems and associated treatments may be used, including even-aged and uneven-aged systems and intermediate treatments.

Fuels treatments include mechanical fuels treatments (typically non-commercial), such as mastication and thinning from below, as well as prescribed burning. They are generally done in the following vegetation types in the GMUG: spruce-fir, spruce-fir-aspen, aspen, lodgepole pine, mixed conifer, ponderosa pine, pinyon-juniper, montane shrubland/oak, and sagebrush. While fuels treatments are typically non-commercial, wood products could be produced and sold to local purchasers, which would reduce the government out-of-pocket expense for the treatment.

Wildlife habitat treatments include mechanical treatments (typically non-commercial) and prescribed burning. They are generally done in the following vegetation types: ponderosa pine, spruce-fir, aspen, pinyon-juniper, spruce-fir-aspen, montane shrubland/oak, and sagebrush. As with fuels treatments, a commercial product may be produced.

Acres of projected timber management projects, fuels treatments, and wildlife habitat treatments for are described in table 35. *See also table 34 for planned timber management practices by vegetation type for typical management practices.*

**Table 34. Estimated annual acres of vegetation management**

[Treatments are classified by their primary purpose, recognizing that many management activities have secondary benefits to other programs]

<b>Forest Cover Type and Management Practice</b>	<b>Years 1 – 10 (acres/year)</b>	<b>Years 11-20 (acres/year)</b>
Salvage sales (primarily in spruce-fir and spruce-fir-aspen)	500	500
Live/green timber harvest in lodgepole pine, spruce-fir, spruce-fir-aspen, mixed conifer, ponderosa pine, and aspen	4,500	4,500



Forest Cover Type and Management Practice	Years 1 – 10 (acres/year)	Years 11-20 (acres/year)
Fuels treatments (mechanical fuels treatments, including mastication and thinning from below, as well as prescribed burning). generally done in spruce-fir, spruce-fir-aspen, aspen, lodgepole pine, mixed conifer, ponderosa pine, pinyon-juniper, montane shrubland/oak, and sagebrush ecosystems.	11,000	15,000
Wildlife habitat treatments (mechanical treatments and prescribed burning). generally done in ponderosa pine, aspen, pinyon-juniper, spruce-fir, spruce-fir-aspen, montane shrubland/oak, and sagebrush ecosystems.	5,000	5,000
Total	21,000	25,000

## Projected Timber Program, Including Projected Timber Sale Quantity and Wood Sale Quantity

The projected timber program, including the projected timber sale and wood sale quantities, are detailed in table 36. *See glossary for definitions.* The total projected timber program is estimated at 55,000 CCF per year.

The projected timber and wood sale quantities are estimates required by the 2012 Planning Rule, but it is important to note they are “*not a target nor a limitation on harvest*” (FSH 1909.12, 60.5). The actual variation in total timber sales year-to-year will depend on market conditions, forest capacity, and location-specific factors. Production on the GMUG varies widely on any given acre and cover type.

The projected timber program is predominantly focused on live/green timber sales, but does assume endemic levels of beetles or other pathogens or fire events will cause some tree mortality and incorporates a small salvage program (5,000 CCF/year) accordingly. However, forest mortality from the variety of disturbances is difficult to predict, particularly given the stressor of climate change. This planned salvage estimate of 5,000 CCF is not a cap or limitation. In the event of a large disturbance with associated extensive forest mortality, more salvage harvest may be conducted as it was during the recent spruce beetle epidemic.

The projected timber sale program is estimated with the additional following assumptions:

- The national forest continues to implement resiliency treatments in spruce-fir and spruce-fir-aspen areas that haven’t exhibited complete mortality after the recent spruce-bark beetle infestation. If higher mortality occurs, salvage treatments may be conducted instead. However, the rate of deterioration of dead trees and the amount of future salvage volume is difficult to predict.
- There is a market for aspen, including aspen from the northern and western portion of the national forest (Grand Valley, Paonia, Norwood, and Ouray areas). Currently there are two purchasers of aspen in Dolores, Colorado, and the Gypsum Powerplant in Gypsum, Colorado, has also expressed interest. Combined, these facilities have the potential to purchase approximately 15,000 CCF per year.
- There is a market for ponderosa pine. While historically only small purchasers would purchase ponderosa pine, the Montrose mill was recently re-fitted for ponderosa pine. In addition, a new mill – IronWood – is interested in ponderosa pine from the GMUG.

- New technology and approaches could make timber harvest in areas with steep slopes (greater than 40 percent) *economically* feasible.
- Timber harvest may be done in areas historically difficult to access and that will require new or more extensive infrastructure, such as longer temporary roads than are typical and/or new permanent roads.
- The GMUG's fiscal capability and organizational capacity are sufficient to produce this amount.
- The projected timber sale program (table 39) was estimated based on the GMUG's past typical volume yields. The GMUG's typical yields per acre at maturity and/or over a rotation, minimum to maximum range, are: 5-10 CCF/acre for spruce-fir and spruce-fir-aspen, 6-10 CCF/acre for ponderosa pine, 7-11 CCF/acre for mixed conifer, 10-12 CCF/acre for lodgepole pine, and 10-20 CCF/acre for aspen. In some cases, particularly with salvage harvests, the prescription would lead to higher volume yield (CCF/acre) than green sales. When this occurs, higher volume output is achieved relative to these green sale figures. The very *midpoint* of the range of these green sale yields would support the final projected timber program, presuming each acre suitable for timber production consistently achieves these yields in every rotation. Note the conifer proportion of the projected program is set to the largest volume calculated to be reasonably consistently achieved given both a) requirements per FSH 1909.12 Chapter 60 to be consistent with other plan direction, b) limitations of other operational factors documented in the final environmental impacts statement, Volume I, chapter 3, *Timber Resources* section, and c) associated environmental effects documented in all affected resource sections, final environmental impacts statement, Volume I, chapter 3.
- A small amount of volume is planned to come from lands outside of the area allocated as suitable for timber production (1250 CCF per year). For example, volume may be recovered when conducting hazard tree removal in a developed recreation site. Harvest volume is also permitted outside of the area suitable for timber production when vegetation management is conducted for other purposes, such as in Recreation Emphasis Areas (MA 4.2). Colorado Roadless Areas are regulated by the Colorado Roadless Rule, which allows for limited tree cutting under specific, restrictive conditions.
- Conversion factors applied 5 board feet per cubic foot (0.5 thousand board feet (MBF)/CCF) for sawtimber and 1.2 tons per CCF for fuelwood.
- The approximate annual timber harvest acreage estimates (table 38) were projected based on a generalized 10 CCF/acre on average across all vegetation types. While some vegetation types typically have higher yield (aspen) and some types have lower yield (conifer) per acre, this potential harvest extent is an approximate average given the distribution of vegetation types within the area considered suitable for timber production.

**Table 35. Projected timber sale program (annual average volume output)**

[The sustained yield limit (SYL) is 127,620 CCF (annual). See the forest plan glossary and FSH 1909.12, Chapter 60 for definition of the required SYL versus the required “projected wood sale quantity” versus “projected timber sale quantity” categories. CCF, one hundred cubic feet; MFB, one thousand board feet.]

<b>Timber Products</b> <i>Does not include salvage or sanitation volumes</i>	<b>Years 1 – 20</b>	<b>Years 1 – 20</b>
<b>1. From lands <i>suitable</i> for timber production</b>	<b>CCF</b>	<b>MBF</b>
A1. Sawtimber	26,750	13,400
A2. Other products (aspen)	17,000	-
<b>2. From lands <i>not suitable</i> for timber production<sup>1</sup></b>	<b>CCF</b>	<b>MBF</b>
B1. Sawtimber	1,250	600
B2. Other products (aspen)	0	-
C. Projected Timber Sale Quantity (A1 + A2 + B1 + B2)	45,000	
<b>Other Estimated Wood Products</b> <i>Do not meet timber product utilization standards</i>	<b>CCF</b>	<b>Tons</b>
D. Fuelwood	5,000	6,000
	<b>CCF</b>	<b>MBF</b>
E. Projected wood sale quantity (C + D)	50,000	
F. Estimated salvage volume	5,000	2,500
<b>G. Total volume including salvage (E + F)</b>	<b>55,000</b>	

- 1) It is important to note that while timber cannot harvested for the purpose of timber production on lands not suited for timber production (36 CFR 219.11(d)(1)), timber harvest may occur on “unsuitable for production lands” as a tool to assist in achieving or maintaining one or more applicable desired conditions or objectives of the plan “to protect other multiple-use values and for salvage, sanitation, public health, or safety” (36 CFR 219.11(c)). Examples of using timber harvest as a tool in the GMUG include, but are not limited to, ecological restoration including meadows or savanna ecosystems, climate change adaptation, improving wildlife or fish habitat, and fuels reduction for wildfire mitigation. (See forest plan standard FW-STND-TMBR-03).
- 2) MBF and tons estimates are not additional, but simply the values in the CCF column converted to MBF or tons. No MBF value is provided for other products (aspen) as aspen is not typically measured in board feet. The only row in tons is fuelwood.

## Forest Plan Objectives

All forest plan objectives are compiled in table 37.

**Table 36. Forest plan objectives**

Resource	Objective
<b>Forest Plan, Chapter 2, Part II</b>	<b>Ecological Sustainability</b>
Ecosystems	<b>FW-OBJ-ECO-04:</b> Within 5 years of plan approval, identify areas of potential climate refugia in the national forests and implement monitoring for a subset of these areas. For assistance in identifying areas in the GMUG with high ecological value and relative climate stability. For implementation, see plan appendix 12, <i>Footnotes Regarding Best Available Scientific Information for supporting information</i> . See also management approach FW-MA-ECO-04.a.
Ecosystems – Riparian Management Zones and Groundwater-Dependent Ecosystems	<p><b>FW-OBJ-RMGD-06:</b> During each 10-year period following plan approval, considering the historic extent of the watershed and riparian systems, restore or enhance at least 2,500 acres of riparian and wetland habitat – including groundwater-dependent ecosystems, and restore or enhance hydrologic function for at least 50 miles of perennial, intermittent, or ephemeral streams. Where consistent with forest plan direction and the Watershed Conservation Practices Handbook (FSH 2509.25), integrate recreational goals into the restoration action. See plan appendix 2 for examples of restoration actions. See also the Forestwide objective for watersheds and water resources, WTR-04.</p> <p>Actions to accomplish this objective may include, but are not limited to: reconnecting incised channels with their floodplains; improving or eliminating at-grade stream vehicle crossings to reduce sedimentation; implementing erosion-control restoration techniques; removing conifer encroachment, combined with associated range management practices; invasive species control; implementing adaptive management strategies and providing offsite livestock water developments and other activities to control sources and causes of streambank erosion; reducing browse on key riparian species via riparian exclosures and other management techniques; road decommissioning and removal of road prisms; supplementing large woody debris and other natural structure material in the floodplain and stream channels to reduce and dissipate energy; enhancing saturation levels to reach potential historic wetland areas using sod plugs, post-assisted log jams, and wicker-weir; abandoned mine land reclamation on impaired waters, and reestablishing riparian/wetland vegetation.</p>
Ecosystems – Riparian Management Zones and Groundwater-Dependent Ecosystems	<p><b>FW-OBJ-RMGD-6.a:</b> Within 3 years of plan approval, complete remote-sensing inventory of wetlands – including fen wetlands - on the GMUG, ongoing at the time of the plan decision. Prioritize ground-truthing within areas suitable for timber production and active grazing allotments, in order to incorporate them into timber sale and grazing management documents. See supporting management approach FW-MA-RMDG-18.</p> <p>See also the Forestwide objective for native species diversity SPEC-03, and the objective for the Recreation Emphasis Management Area EMREC-02.</p>

Resource	Objective
Ecosystems – Aquatic Species and Habitat	<p><b>FW-OBJ-AQTC-03:</b> Within 5 years of plan approval, 1) identify areas critical to the conservation of native aquatic and semi-aquatic species (e.g., spawning areas and breeding habitat), 2) develop monitoring (e.g., streambank stability), and 3) if desired conditions are not being met and causal factors are identified, apply conservation measures to ensure the long-term persistence of associated native aquatic and semi-aquatic species, and the population viability of at-risk aquatic and semi-aquatic species. <i>See also the Forestwide objective RMGD-06.</i></p> <p><b>Actions to accomplish this objective may include, but are not limited to:</b> fish barriers, diversion screens, invasives removal, modification of range allotment annual operating instructions, and beaver-based restoration.</p>
Invasive Species	<p><b>FW-OBJ-IVSP-02:</b> Annually, invasive species management actions are completed on at least 2,000 acres so that new infestations are prevented; densities of existing infestations are reduced; total acres or areas infested are reduced; infested areas are restored/rehabilitated; existing infestations are contained, controlled, suppressed, or eradicated depending on infestation characteristics (such as size, density, species, and location), management opportunities, and resource values at risk; and uninfested areas are maintained and/or protected. <i>See also Management Approaches for Invasives for best practices.</i> Priority treatments will include, not necessarily in the following order:</p> <ul style="list-style-type: none"> <li>• Early treatment of new infestations so that they are eradicated before becoming entrenched.</li> <li>• Annual treatment of administrative sites until populations are eradicated.</li> <li>• Treatment of cheatgrass in sagebrush, particularly Gunnison sage-grouse designated critical habitat. <i>See also the Forestwide objective for native species diversity SPEC-03.</i></li> <li>• Treatment of infestations that are or have the potential to negatively impact at-risk species.</li> <li>• Piscicide treatments conducted by Colorado Parks and Wildlife to remove invasive fishes from identified watersheds to facilitate cutthroat trout restoration efforts.</li> </ul>
Fuels	<p><b>FW-OBJ-FFM-02:</b> To move toward desired ecological conditions (<i>see plan section Key Ecosystem Characteristics</i>) and reduce the risks and negative impacts of uncharacteristic wildland fire, treat approximately 110,000 acres in the first decade of plan implementation, and 150,000 acres in the second decade, through the implementation of vegetation management techniques, including the use of wildland fire (planned and unplanned) and mechanical methods (e.g., thinning of ladder fuels and mastication).</p> <p><b>Actions to accomplish this objective may include, but are not limited to:</b> moving ponderosa pine stands toward fire-maintained open stand structure with a mix of age and size classes, strategically locating fuel treatments with natural and constructed barriers or fuel breaks to create 'fuel reduction zones' on the landscape, and prioritizing treatments within the wildland-urban interface.</p>
Species (General)	<p><b>FW-OBJ-SPEC-03:</b> During each 10-year period following plan approval, restore or enhance at least 50,000 acres of habitat. Priority treatment areas should include (but are not limited to) wildlife management areas, aspen, riparian areas, ecotones, winter range in pinyon-juniper communities, connectivity areas, designated critical habitat, and other habitat for at-risk GMUG species. <i>See also the desired condition for wildlife management areas, MA-DC-WLDF-01.</i></p> <p><b>Actions to help accomplish this objective may include, but are not limited to:</b> improving wildlife or habitat connectivity by removing unneeded structures, eliminating redundant system routes, converting mode of travel for specific system routes, or realigning system routes into less impactful settings, implementing vegetation management practices that maintain or enhance connectivity, retrofitting or designing new structures (e.g., building new or converting existing fences to wildlife-friendly fence specifications such as a lay-down fence), improving aquatic and riparian resources (e.g., remove barriers, restore dewatered stream segments, connect fragmented habitat, provide organism passage (such as aquatic organism passage).</p>

Resource	Objective
Species (General)	<b>FW-OBJ-SPEC-04:</b> During the first 5 years following plan approval, install vent pipe screens on all existing restrooms at developed or dispersed recreation sites to prevent bird entrapment.
Species (Bats)	<b>FW-OBJ-SPEC-08.c:</b> Within 2 years of plan approval, in order to limit the potential for introduction and spread of disease to caves and mines used by bats, coordinate with Colorado Parks and Wildlife and other partners to provide public education materials regarding best management practices for the public and permittees, including on existing signage at open abandoned mine sites. While there are few caves on the GMUG, provide public education materials for recreational caving users regarding the risk of spreading the fungus that causes white-nose syndrome or other emergent diseases on caving equipment and clothing and to take appropriate prevention measures.
Species (At-Risk Plants)	<b>FW-OBJ-SPEC-28:</b> Within 3 years of plan approval, identify locations where illegal off-route motorized travel is a risk factor for at-risk plant occurrences. Within 10 years of plan approval, develop actions to minimize this risk at all known locations. Such actions include construction of adequate turn-around and pull-off areas, as well as fencing and/or physical barriers where necessary. If used, physical barriers should be compatible with the design/development/management level of trail.
Species (At-Risk Plants)	<b>FW-OBJ-SPEC-29:</b> Within 3 years of plan approval, install cameras near occurrences of <i>Sclerocactus dawsonii</i> and <i>Phacelia submutica</i> to increase understanding of potential big game, recreation, and livestock impacts. If evidence indicates that negative impacts from wildlife, recreation, or livestock are occurring, work with Colorado Parks and Wildlife (as applicable) and relevant GMUG staff areas to mitigate these impacts.
Species (At-Risk Plants)	<b>FW-OBJ-SPEC-30:</b> Within 5 years of plan approval, implement actions to minimize the potential for illegal off-route motorized travel within 600 feet of known occurrences of <i>Sclerocactus dawsonii</i> and <i>Phacelia submutica</i> . Such actions may include construction of adequate turn-around and pull-off areas, as well as fencing and/or physical barriers where necessary. If used, physical barriers should be compatible with the design/development/management level of trail.
Species (At-Risk Plants)	<b>FW-OBJ-SPEC-30.a:</b> Within 3 years of plan approval, identify locations where invasive plants and noxious weeds are a risk factor for known at-risk plant occurrences. Within 10 years of plan approval, implement actions to minimize this risk at all known locations. Such actions include establishing priority treatment areas, training relevant staff on the identification of invasives, noxious weeds, and at-risk plant species, establishing methods to reduce non-target effects from herbicide application. <i>See also Forestwide objective IVSP-02.</i>
Species (Canada Lynx)	<b>FW-OBJ-SPEC-33.a:</b> Within 5 years of plan approval, identify and evaluate threats and habitat conditions within Canada lynx linkage areas with partners (to include but not limited to: U.S. Fish and Wildlife Service, Colorado Parks and Wildlife, Colorado Department of Transportation, Bureau of Land Management) to gain an understanding of how to provide desired habitat connectivity. <i>See also management approaches for Canada lynx.</i>
Species (Sage-grouse)	<b>FW-OBJ-SPEC-37.b:</b> Biennially, complete a report on GMUG National Forests Recovery Implementation Strategy progress and habitat monitoring results. Report accomplishments in the <a href="#">Conservation Efforts Database</a> . For transparency, share this report with partners including but not limited to U.S. Fish and Wildlife Service and Colorado Parks and Wildlife. All completed grazing allotment NEPA sufficiency reviews within GUSG allotments should be included in the annual reporting to the Service. <i>See FW-OBJ-SPEC-37.c.</i>

Resource	Objective
Species (Sage-grouse)	<b>FW-OBJ-SPEC-37.c:</b> Within 3 to 5 years of plan approval, grazing sufficiency reviews should be conducted on all GUSG allotments with current NEPA decisions – in both occupied and unoccupied designated critical habitat – and should include best available science and technical assistance with the Service to determine 1) how authorized grazing does or does not impact GUSG habitat Primary Constituent Elements, 2) if adverse effects are resulting from the currently authorized grazing actions, and 3) if current NEPA provides coverage for grazing authorizations, including whether updated section 7 consultation of the allotment is warranted. Information to determine NEPA adequacy should include previous and current Annual Operating Instruction information, GUSG population metrics, and any existing: monitoring data, Habitat Assessment Framework data, Rangeland Analysis Platform data, Ecological Site Description potential, and any other data useful to determine allotment health. Completion of allotment sufficiency reviews should first prioritize occupied and areas with high habitat suitability in GUSG designated critical habitat.
Species (Sage-grouse)	<b>FW-OBJ-SPEC-38:</b> Within 5 years of plan approval, identify redundant system routes to consider for permanent or seasonal closure, and close rehabilitate illegal routes (non-system, user-created) in suitable Gunnison sage-grouse habitat within 4 miles of mapped Gunnison sage-grouse leks.
Species (Sage-grouse)	<b>FW-OBJ-SPEC-39:</b> Within 5 years of plan approval, install educational signs at priority kiosks, trailheads, or road access points that serve as portals to occupied Gunnison sage-grouse habitat to 1) request the public to leash pets when recreating, and 2) to inform users about common noxious weeds and how to identify and report observations in order to enhance early detection and treatment response. Coordinate prioritization with partners.
Species (Sage-grouse)	<b>FW-OBJ-SPEC-40:</b> Within 5 years of plan approval, identify, assess, and prioritize sections of fence lines or other infrastructure in Gunnison sage-grouse habitat with a high potential for sage-grouse collision and mortality based on best available scientific information. Evaluate options for removal (if no longer needed), relocation (if feasible), or marking to increase visibility.
Conservation Watershed Network	<b>FW-OBJ-SPEC-54:</b> Within 5 years of plan approval, develop strategic plans for the Conservation Watershed Network target species (western toad (previously named the “boreal toad”) and green-lineage Colorado River cutthroat trout). Within 10 years of plan approval, complete two activities to restore or enhance habitat and address pertinent threats.
Watersheds and Water Resources	<b>FW-OBJ-WTR-04:</b> During each 10-year period following plan approval, develop three watershed restoration action plans and take actions within those plans that lead to trending toward improved watershed conditions, including their chemical, physical, and biological attributes, based upon the watershed condition framework or other accepted protocols. <i>See also the Forestwide objective for infrastructure, INFR-03 and for riparian management zones and groundwater-dependent ecosystems, RMGD-06.</i>  <b>Actions to help accomplish this objective may include, but are not limited to:</b> rehabilitating areas to reduce erosion and sedimentation delivery to waterbodies, improving 303(d)-listed streams, and/or other passive or active restoration efforts.
Watersheds and Water Resources	<b>FW-OBJ-WTR-04.a:</b> Over the life of the plan, ensure that all water rights owned by the Forest Service are put to their decreed beneficial use or are properly disposed of if no longer needed.
<b>Forest Plan, Chapter 2, Part III</b>	<b>Ecosystem Services and Multiple Uses</b>
Cultural and Historic Resources	<b>FW-OBJ-CHR-02:</b> Within 5 years of plan approval, fire-sensitive cultural resource (e.g., historic structures, wickiups, and culturally modified trees) locations are identified in Heritage GIS in order to facilitate protective measures during wildland fire management.
Cultural and Historic Resources	<b>FW-OBJ-CHR-03:</b> Within 5 years of plan approval, identify and map populations of <i>Ligusticum porteri</i> (commonly known as oshá) for Tribes.

Resource	Objective
Designated Trails	<b>FW-OBJ-DTRL-04:</b> Within 10 years of plan approval, relocate the Continental Divide National Scenic Trail off of roads.
Designated Trails	<b>FW-OBJ-DTRL-17:</b> Within 10 years of plan approval, provide interpretive signage by at least three prominent access points along the Old Spanish National Historic Trail to enhance user experience and wayfinding.
Designated Trails	<b>FW-OBJ-DTRL-19:</b> Within 5 years of plan approval, complete condition surveys and initiate addressing deferred maintenance needs along the Bear Creek and Crag Crest National Recreation Trails.
Energy and Mineral Resources	<b>FW-OBJ-ENMI-02.a:</b> Reclaim or address one abandoned mine land features each year following the adoption of the plan to protect water quality, classified water uses, and/or public health or safety.
Infrastructure	<b>FW-OBJ-INFR-03:</b> Every 10 years, complete one action in vulnerable and/or poor/impaired watersheds, as identified in the <i>GMUG Watershed Vulnerability Assessment</i> (USDA Forest Service 2013a) and the watershed condition framework ratings, to reinforce existing Forest Service infrastructure to withstand extreme weather events. <i>See infrastructure management approaches for more detail. See also the Forestwide desired conditions for water resources, WTR-01 and WTR-02.</i>
Range	<b>FW-OBJ-RNG-03:</b> At least annually, maintain ecological integrity and productivity of all ecotypes by evaluating allotment management with permit holders to adjust timing, intensity, duration, and frequency of livestock grazing when necessary to respond to changing ecological conditions or resource concerns such as drought, delayed snowmelt, extended forage season, wildfire, and prescribed fire.
Range	<b>FW-OBJ-RNG-04:</b> Within 10 years of plan approval, remove woven wire fencing in priority locations and where it is no longer needed (e.g., closed allotments, active or vacant cattle allotments unlikely to be converted to sheep allotments, within Gunnison sage-grouse critical habitat, research or forage utilization exclosures), after consulting with grazing permittees, GMUG resource specialists, and Colorado Parks and Wildlife to determine priorities and feasibility.
Recreation	<b>FW-OBJ-REC-03:</b> Annually, manage developed recreation sites to National Quality Standards for at least 900,000 persons at one time.
Recreation	<b>FW-OBJ-REC-04:</b> Within 10 years of plan approval, enhance the resiliency of alpine ecosystems on at least 100 acres of GMUG lands through implementing recreation management plans and/or road and trail decommissioning. <i>See the Forestwide desired condition for Key Ecosystems Characteristics ECO-03.</i>
Recreation	<b>FW-OBJ-REC-05:</b> Within 10 years of plan approval, at a minimum of five recreation sites, improve their design to meet the Forest Service Outdoor Recreation Accessibility Guide or comparable direction. Over the life of the plan, meet accessibility guidance at all developed recreation sites.
Recreation	<b>FW-OBJ-REC-06:</b> Eliminate at least one unauthorized travel route annually.
Scenery	<b>FW-OBJ-SCNY-02:</b> Within 10 years of plan approval, complete three projects that improve the scenic integrity in areas that do not meet established scenic integrity objectives. Priority activities include decommissioning or rehabilitating unauthorized system roads and routes, removing unnecessary fences, restoring grasslands and aspen stands, and painting facilities, particularly within the immediate foreground of scenic byways. <i>See also the Forestwide desired condition for Scenic Byways, SBWY-01.</i>
Timber and Other Forest Products	<b>FW-OBJ-TMBR-C:</b> Build and continue to update a centralized and comprehensive GIS dataset of temporary roads and their status across the GMUG as 1) legacy temporary roads are identified/closed/decommissioned or 2) current temporary roads are approved in a timber sale contract, and then closed/decommissioned.



Resource	Objective
Trails	<b>FW-OBJ-TRLS-02:</b> Annually, maintain at least 500 miles of National Forest System trails, per the INFRA database definition of “maintained to standard.” Trails are prioritized by those located in recreation emphasis areas (MA 4.2 – EMREC), by amount of use, and trails where use is causing unacceptable resource damage (FW-STND-REC-07) or presenting hazards outside of the trail class. <i>See also the Forestwide desired condition for partnerships, PART-01.</i>
<b>Forest Plan Chapter 3</b>	<b>Management Area Direction</b>
Wilderness (MA 1.1)	<b>MA-OBJ-WLDN-04:</b> Within 10 years of plan approval, remove all non-historic structures and installations within wilderness areas, unless they are the minimum necessary for the administration of wilderness or otherwise authorized by law or existing private right, pursuant to the Wilderness Act of 1964. <sup>6</sup>
Wilderness (MA 1.1)	<b>MA-OBJ-WLDN-05:</b> Within 10 years of plan approval, initiate wilderness stewardship plans for each congressionally designated wilderness area for which the GMUG is the lead unit: West Elk, Raggeds, Fossil Ridge, La Garita, Mount Sneffels, Powderhorn, Uncompahgre, and Lizard Head. This excludes Maroon Bells-Snowmass, for which the White River National Forest is lead, and Collegiate Peaks, for which the Pike-San Isabel National Forests and Cimarron and Comanche National Grasslands is the lead unit.
Recommended Wilderness (MA 1.2)	<b>MA-OBJ-RECWLD-03:</b> Within 5 years of plan approval, physically close all unauthorized routes within recommended wilderness and take actions that promote restoration along such routes.
Tabeguache and Roubideau Areas (MA 1.3)	<b>MA-OBJ-TABROU-04:</b> Within 10 years of plan approval, remove all non-historic structures and installations within Tabeguache and Roubideau Areas, unless authorized by law or valid existing right or essential for maintaining wilderness character.
Tabeguache and Roubideau Areas (MA 1.3)	<b>MA-OBJ-TABROU-05:</b> Within 10 years of plan approval, in a manner consistent with wilderness administration, complete wilderness character baseline assessments and initiate management planning for the Tabeguache and Roubideau Areas.
Special Interest Areas (MA 2.1)	<b>MA-OBJ-SIA-02:</b> Within 5 years of plan approval, complete special interest area management plans, including official boundary descriptions and maps, for existing and newly designated special interest areas.
Wildlife Management Areas (MA 3.2)	<b>MA-OBJ-WLDF-03:</b> Within 5 years of plan approval, identify potential area-specific management actions for each wildlife management area to improve habitat connectivity and to achieve desired ecological conditions for constituent ecosystems. Within 10 years of plan approval, complete one action in each wildlife management area.

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<sup>6</sup> Structures and installations (developments) are prohibited by Section 4(c) of the Wilderness Act of 1964, but Section 4(c) of the Act also provides for exceptions, when such features are the minimum requirement for the administration of the area for the purpose of the Act (*see Section 2(a)*). Decisions are informed by a minimum requirements analysis, which has two implicit steps: 1) determine whether action (feature) is *necessary* to the administration of the area as wilderness, and 2) determine the *action* that best preserves wilderness character.

Resource	Objective
Recreation Emphasis Areas (MA 4.2)	<p><b>MA-OBJ-EMREC-02:</b> Within 5 years of plan approval, accomplish management actions in at least five noticeably degraded dispersed overnight use areas (rated as an overall impact rating of 6 to 8 using the National Minimum Recreation Site Monitoring Protocol), as detailed in Recreation FW-STND-REC-07. The standard REC-07 will be applied to determine when thresholds have been reached and more active management is needed. The objective will be achieved when the executed management actions decidedly address the issues that led to the thresholds being reached or surpassed in the first place. Initial priority areas include:</p> <ul style="list-style-type: none"> <li>• Crested Butte</li> <li>• Taylor Park</li> <li>• Any other applicable overnight use locations identified on the EMREC map.</li> <li>• Existing campsites within the riparian management zone (See <i>Riparian Management Zones</i> section).</li> </ul> <p><i>See also Recreation Management Approaches section for supporting implementation practices.</i></p>
Recreation Emphasis Areas (MA 4.2)	<p><b>MA-OBJ-EMREC-03:</b> Within 5 years of plan approval, accomplish management actions in at least five noticeably degraded areas from dispersed day-use activities (e.g., hiking, angling, picnicking), as detailed in the Forestwide recreation standard, FW-STND-REC-08. Standard REC-08 will be applied to determine when thresholds have been reached and more active management is needed. The objective will be achieved when the executed management actions decidedly address the issues that led to the thresholds being reached or surpassed in the first place. Initial priority areas include:</p> <ul style="list-style-type: none"> <li>• Existing unauthorized trails within sensitive areas (e.g., riparian or high alpine areas).</li> <li>• Any applicable day-use locations identified on the EMREC map.</li> </ul> <p><i>See also the Forestwide objective for trails (FW-OBJ-TRLS-02) and the Recreation Management Approaches section for more information on implementation.</i></p>

<sup>1</sup> Miles of National Forest System trail on which at least one maintenance task is performed to standard during the fiscal year. This measure includes annual maintenance and deferred maintenance (repair, replace, decommission). [Trail National Quality Standards](#) are available online.

## Appendix 3. Scenic Integrity Descriptions and Scenic Travelways

### Scenic Integrity Descriptions

Scenic integrity objectives were established and mapped for the GMUG to implement the following guideline:

*Scenery FW-GDL-SCNY-03: To maintain or improve scenic character over the long-term and perpetuate high-quality scenic values consistent with the GMUG's distinctive roles and contributions, all forest management activities should be consistent with or move the area toward achieving desired scenic integrity objectives. For example, this includes shaping and blending any even-aged regeneration cuts, as well as other harvest types and fuel treatments, to the extent practicable with the natural terrain.*

The following text is intended to document *how* scenic integrity objectives were established and mapped. For some management areas and overlays, scenic integrity objectives have been categorically identified (table 38). There is more variation for other management areas and overlays, as noted below the table. *See plan appendix 1 links to online maps.*

**Table 37. Scenic integrity objectives by management area and overlay**

[SIO, scenic integrity objective. This table indicates the categorical SIO settings for a given management area or other mapped feature.]

Scenic Integrity Objective	Description	Management Areas and Overlays	Acres and percentage of the national forest
Very High	In areas with very high scenic integrity objectives, the scenic character should have only minor, if any, deviations. The areas should appear unaltered, and the majority of the area should be dominated by ecological changes.	<ul style="list-style-type: none"> <li>• Congressionally Designated Wilderness (MA 1.1)</li> <li>• Recommended Wilderness (MA 1.2)</li> <li>• Eligible wild and scenic rivers classified as “wild”</li> </ul>	658,000 (22 percent)
High	In areas with high scenic integrity objectives, the scenic character should appear intact but may include deviations that are not evident (i.e., completely repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).	<ul style="list-style-type: none"> <li>• Tabeguache and Roubideau Congressionally Designated Areas (MA 1.3)</li> <li>• Some Special Interest Areas (Slumgullion Slide, Mt. Emmons Iron Fen, Ophir Needles, and Alpine Tunnel) (MA 2.1)</li> <li>• Research Natural Areas (MA 2.2)</li> <li>• Fossil Ridge Recreation Management Area (MA 2.3)</li> <li>• Colorado Roadless Areas (MA 3.1), with the following exceptions: <ul style="list-style-type: none"> <li>▪ Where Roadless areas overlap with recommended wilderness, they are Very High.</li> <li>▪ Roadless areas with existing leases for mineral development are Moderate.</li> <li>▪ Where Roadless areas coincide with a utility corridor overlay, they may be Low, notwithstanding other overlapping criteria per below.</li> </ul> </li> <li>• Eligible wild and scenic rivers classified as “scenic and recreational” with otherwise existing/mapped High scenic integrity, as indicated on the SIO maps.</li> <li>• Scenic byways, with the following exception: <ul style="list-style-type: none"> <li>▪ Where the San Juan Skyway and Grand Mesa Scenic Byway overlay coincides with the utility corridor overlay, the scenic integrity objective is Moderate.</li> </ul> </li> <li>• National scenic and historic trails and national recreation trails, with the following exception: <ul style="list-style-type: none"> <li>▪ Where the Continental Divide National Scenic Trail overlay coincides with the utility corridor overlay and/or the</li> </ul> </li> </ul>	1,031,000 (35 percent)

Scenic Integrity Objective	Description	Management Areas and Overlays	Acres and percentage of the national forest
		Monarch Ski Area, the scenic integrity objective is Moderate.	
Moderate	In areas with moderate scenic integrity objectives, the scenic character may appear slightly altered. Management activities, manmade structures and facilities should not dominate the scenic character (i.e., repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).	<ul style="list-style-type: none"> <li>Gunnison Research Special Interest Area (MA 2.1)</li> <li>Eligible wild and scenic rivers classified as “scenic and recreational” with otherwise existing/mapped Moderate scenic integrity</li> <li>Colorado Roadless Areas (MA 3.1), with the following exceptions: <ul style="list-style-type: none"> <li>Where Roadless areas overlap with recommended wilderness, they are Very High.</li> <li>Where Roadless areas coincide with a utility corridor overlay, they may be Low.</li> </ul> </li> <li>Monarch Ski Area in Mountain Resorts (MA 4.1), where it crosses the Continental Divide National Scenic Trail corridor.</li> </ul>	861,000 (29 percent)
Low	In areas with low scenic integrity objectives, the scenic character may appear moderately altered. Management activities including manmade structures and facilities may begin to dominate the scenic character but use scenic attributes to blend into the landscape (i.e., repeat the scenic attributes of size, shape, form, line, color, texture, or patterns common to the scenic character).	<ul style="list-style-type: none"> <li>Dry Mesa Quarry Special Interest Area (MA 2.1)</li> <li>Mountain Resorts (MA 4.1), with the following exception: <ul style="list-style-type: none"> <li>As noted above, where the Monarch Ski Area crosses the Continental Divide National Scenic Trail corridor, the scenic integrity objective is Moderate.</li> </ul> </li> <li>Utility corridors, with the following exception: <ul style="list-style-type: none"> <li>As noted above, where the utility corridor overlay coincides with the overlays for scenic byways and/or the Continental Divide National Scenic Trail overlay, the scenic integrity objective is Moderate.</li> </ul> </li> </ul>	420,000 (14 percent)

Scenic integrity objectives for some management areas and overlays vary – *for results, see final plan maps:*

- Wildlife management areas (MA 3.2) – Scenic integrity objectives vary from High to Low depending on underlying area (e.g., Colorado roadless area) and other factors (e.g., concern level routes and distance zones).
- Recreation emphasis areas (MA 4.2) – Scenic integrity objectives vary from High to Low depending on overlapping areas (e.g., Colorado roadless areas) and other factors (e.g., concern level 1 routes.).
- General forest and rangelands (MA 5) – Scenic integrity objectives vary from High to Low depending on overlapping areas (e.g., mapped recreation opportunity spectrum (ROS) settings) or other factors (e.g., concern level 1 routes).
- Recreation opportunity spectrum (ROS) settings – Mapped semi-primitive non-motorized recreation opportunity spectrum (ROS) areas are primarily Moderate, High, or Very High scenic integrity objective, depending on decisions for overlapping areas (e.g., Colorado roadless areas) or other factors (e.g., concern level routes and distance zones).
- Eligible wild and scenic rivers – Scenic integrity objectives for all classified “wild” segments are Very High, as noted in table 38. and only Low where coincident with the utility corridor overlay.

## Scenic Travelways

The following scenic travelways are those roads, trails, and streams in the national forests identified as high concern for scenery (concern level 1) in the 2018 Scenery Management System Inventory Report (USDA Forest Service 2021) (table 39).

## References Cited

USDA Forest Service. 2021. Scenery management system inventory report. Grand Mesa, Uncompahgre, and Gunnison National Forests. Prepared by Nicole R. Hill, Landscape Architect, Forest Service Enterprise Program

**Table 38. Scenic travelways – roads, trails, and streams**

[AADT, average annual daily traffic; CDOT, Colorado Department of Transportation; OTIS, Online Transportation Information Systems]

Name, Road Number, or Location	Rationale
U.S. Highway 50: Doyleville to Monarch Pass	2,500 to 3,300 AADT (CDOT OTIS). High interest/high use – concern level 1.
Forest Highway 742 – Taylor River Road: Almont to Taylor Park Reservoir. [Entire road because Taylor River Canyon and Taylor Park Reservoir listed are listed as concern level 1.]	Traffic volume not available from CDOT. High interest/high use – concern level 1.
I-70: DeBeque Canyon	Moderate interest/very high use – concern level 2.
San Juan Skyway All American Road: U.S. Highway 550, State Highways 62 and 145 (Red Mountain Pass to Ridgeway on to Placerville, then on to Telluride and Lizard Head Pass)	1,700 to 8,500 AADT (CDOT OTIS). Designated to the Federal Highway Administration most selective National Scenic Byway category. High interest/high use – concern level 1.
Grand Mesa Scenic and Historic Byway: State Highway 65 (Cedaredge to I-70) and Forest highway 100 (Lands' End Road – Hwy 65 to Lands' End shelter house)	700 to 3,700 AADT (CDOT OTIS). Designated to the Federal Highway Administration National Scenic Byway category. High interest/high use – concern level 1.
Silver Thread Scenic and Historic Byway: State Highway 149 from Lake City to Spring Creek Pass	410 to 1,800 AADT (CDOT OTIS). Designated by the State of Colorado and Forest Service as a scenic byway. High interest/high use – concern level 1.
West Elk Loop Scenic and Historic Byway: U.S. Highway 50; State Highways 133, 92, and 135; County Road 12 – Kebler Pass	500 to 12,000 AADT (CDOT OTIS). Designated by the State of Colorado and Forest Service as a scenic byway. High interest/moderate to high use – concern level 1.
Alpine Loop Scenic Backcountry Byway: Forest Road 878 from State Highway 550 to Engineer Pass. [Included entire loop at Chiara Palazzolo's guidance.]	Traffic volume not available from CDOT. Designated by the State of Colorado and Bureau of Land Management as a scenic byway. High interest/low use – concern level 1.
Unaweep Tabeguache Scenic and Historic Byway: State Highway 141 from White Water to Naturita and State Highway 145 from Naturita to Placerville	230 to 5,000 AADT (CDOT OTIS). Designated by the State of Colorado and Bureau of Land Management as a scenic byway. High interest/high use – concern level 1.
Forest Road 209 – Cottonwood Pass Road: Taylor Park Reservoir to Cottonwood Pass	High interest/moderate use – concern level 1 Forest Road 209 has been upgraded to the east so more people are using it and it will be upgraded on Forest Service side

Name, Road Number, or Location	Rationale
Forest Road 742 – Upper Taylor River Road: Taylor Park Reservoir to Dorchester Campground	High interest/moderate use – concern level 1
Forest Road 765 – Cumberland Pass: Taylor Park Reservoir to Pitkin	High interest/low use – concern level 1
Hinsdale County Road 20 – Henson Creek Road: Lake City to Capitol City	High interest/low use – concern level 1
Forest Road 858 – Owl Creek Pass Road: U.S. Highway 50 to U.S. Highway 550	High interest/moderate use – concern level 1
Forest Road 853 – Camp Bird Mine Road and Yankee Boy Basin Road (853.1B). U.S. Highway 550 to Blue Lake Trailhead	High interest/moderate use – concern level 1
Forest Road 869 – Imogene Pass Road: Forest Road 853 to Telluride	High interest/moderate use – concern level 1
Forest Road 648 – Black Bear Mine Road: U.S. Highway 550 to Telluride and State Highway 145	High interest/moderate use – concern level 1
Forest Road 630 – Ophir Pass Road: U.S. Highway 550 to Ophir and State Highway 145	High interest/moderate use – concern level 1
Forest Road 709 – Coal Creek Road: Paonia Reservoir to Robinson Creek Trailhead (West Elk Wilderness)	High interest/low use – concern level 1
Gunnison County Road 317 (from Crested Butte to Gothic)	High interest/low use – concern level 1
Forest Road 7317 – Schofield Pass (from Gothic to national forest boundary)	High interest/low use – concern level 1
Forest Road 730 – Ohio Pass Road	High interest/low use – concern level 1
Forest Road 632 - Alta Lakes	High interest/moderate use – concern level 1
Continental Divide National Scenic Trail	High interest/low to moderate use – concern level 1 New alignment and potential reroutes included. Coincides with Colorado Trail.
Crag Crest National Recreation Trail	High interest/high use – concern level 1
Bear Creek National Recreation Trail	High interest/high use – concern level 1
Powderhorn Sunlight Snowmobile Trail	High interest/high use – concern level 1
Galloping Goose Trail	High interest/low use – concern level 1
Trail Riders Trail (Trail 401) (Gunnison RD, Crested Butte area)	High interest/moderate use – concern level 1



<b>Name, Road Number, or Location</b>	<b>Rationale</b>
Forest Road 636 – Bridal Veil (closed to motorized use, list as trail)	High interest/moderate use – concern level 1
Upper Taylor River	High interest/moderate use – concern level 1
Taylor River Canyon	High interest/moderate use – concern level 1
South Fork of San Miguel River	High interest/moderate use – concern level 1

## Appendix 4. Southern Rockies Lynx Amendment Direction

### Background

The Southern Rockies Lynx Amendment was completed in 2008 and when signed it effectively amended forest plan direction for the Canada lynx (*Lynx canadensis*) on eight existing forest plans in the Rocky Mountain Region of the U.S. Forest Service, including that of the Grand Mesa, Uncompahgre, and Gunnison National Forests. With the record of decision for the GMUG forest plan, the direction prescribed in the 2008 Southern Rockies Lynx Amendment is incorporated, as supplemented below, as GMUG forest plan direction. New clarifying text and direction per the GMUG revised plan is highlighted in gray.

Note the Southern Rockies Lynx Amendment direction was developed prior to the 2012 Planning Rule. The direction in the Southern Rockies Lynx Amendment is formatted differently than direction contained in this forest plan. Superscript numbers in the text of this appendix refer to definitions contained in the Southern Rockies Lynx Amendment, which are included at the end of this appendix, section *Lynx Amendment Glossary*.

### Southern Rockies Lynx Amendment – Management Direction, As Supplemented by the GMUG Revised Forest Plan

#### GOAL<sup>14</sup>

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 in occupied habitat and in linkage areas, subject to valid existing rights. They do not apply to wildland fire suppression, or to wildland fire use<sup>7</sup>.

#### Objective<sup>30</sup> ALL O1

Maintain<sup>26</sup> or restore<sup>40</sup> lynx habitat<sup>23</sup> connectivity<sup>16</sup> in and between lynx analysis units<sup>21</sup>, and in linkage areas<sup>22</sup>.

#### Standard<sup>44</sup> ALL S1

New or expanded permanent developments<sup>33</sup> and vegetation management<sup>50</sup> projects<sup>36</sup> must maintain<sup>26</sup> habitat connectivity<sup>16</sup> in a lynx analysis unit<sup>21</sup> and/or linkage area<sup>22</sup> by maintaining forest structure and tree species diversity to support lynx use and movements as recommended in Squires et al. (2020):

- Maintain live and dead forest canopy cover percentages used by lynx as documented in Squires et al. (2020; see Figure 2 in publication).

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<sup>7</sup> “Fire use” is an outdated term but retained throughout this section, excerpted from the 2008 Southern Rockies Lynx Amendment. At the time of the plan decision, the contemporary equivalent is that there are multiple objectives for natural-caused wildfires.

- Maintain the highest density of large snags and coarse woody debris (e.g., manage for the upper range limit as specified in FW-GDL-ECO-07, table 5), outside of wildland-urban interface areas.
- In forests affected by bark beetles, protect and retain healthy, live subalpine fir and Engelmann spruce trees.
- *Also see supporting management approaches for Canada lynx in the GMUG revised land management plan (Chapter 2, Part II, Native Species Diversity).*

Guideline<sup>15</sup> ALL G1

Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways<sup>18</sup> or forest highways<sup>12</sup> across Federal land. Methods could include fencing, underpasses, or overpasses.

Standard<sup>44</sup> lynx analysis unit S1

Changes in lynx analysis unit<sup>21</sup> boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.

**VEGETATION MANAGEMENT ACTIVITIES AND PRACTICES (VEG).** The following objectives, standards, and guidelines apply to vegetation management projects<sup>36</sup> in lynx habitat within lynx analysis units in occupied habitat. With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards, and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments such as mineral operations, ski runs, roads, and the like. None of the objectives, standards, or guidelines apply to linkage areas.

Objective<sup>30</sup> VEG O1

Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.

Objective VEG O2

Provide a mosaic of habitat conditions through time that support dense horizontal cover<sup>19</sup>, and high densities of snowshoe hare. Provide winter snowshoe hare habitat<sup>51</sup> in both the stand initiation structural stage and in mature, multi-story conifer vegetation.

Objective VEG O3

Planned and unplanned (natural) ignitions are managed to promote fire as an ecological process, recognizing and upholding its natural role in effecting change in vegetation structure and composition over time.

Objective VEG O4

Focus vegetation management<sup>50</sup> in areas that have potential to improve winter snowshoe hare habitat<sup>52</sup> but presently have poorly developed understories that lack dense horizontal cover.

Standard<sup>44</sup> VEG S1

**Where and to what this applies:** Standard VEG S1 applies to all vegetation management<sup>50</sup> projects<sup>36</sup> that regenerate<sup>38</sup> forested stands, except for fuel treatment<sup>13</sup> projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> as defined by the Healthy Forests Restoration Act<sup>17</sup>, subject to the following limitation:

Fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> that do not meet Standards VEG S1, VEG S2, VEG S5, or VEG S6 or VEG S8 shall occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a national forest or administratively

combined national forests). In addition, fuel treatment projects may not result in more than three adjacent lynx analysis units exceeding the standard.

*For fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> see guideline VEG G10.*

The standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages<sup>45</sup> limit disturbance in each lynx analysis unit as follows:

If more than 30 percent of the lynx habitat in a lynx analysis unit is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects<sup>36</sup>.

#### Standard VEG S2

**Where and to what this applies:** Standard VEG S2 applies to all timber management<sup>47</sup> projects<sup>36</sup> that regenerate<sup>38</sup> forests, except for fuel treatment<sup>13</sup> projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> as defined by the Healthy Forests Restoration Act<sup>17</sup>, subject to the following limitation:

Fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> that do not meet Standards VEG S1, VEG S2, VEG S5, or VEG S6 shall occur on no more than 3 percent (cumulatively) of lynx habitat on each administrative unit (a national forest or administratively combined national forests).

*For fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> see guideline VEG G10.*

**The standard:** Timber management<sup>47</sup> projects<sup>36</sup> shall not regenerate<sup>38</sup> more than 15 percent of lynx habitat on National Forest System lands within a lynx analysis unit in a 10-year period. This 15 percent includes the entire stand within an even-age regeneration area, and only the patch opening areas within group selections. Salvage harvest within stands killed by insect epidemics, wildfire, etc. does not add to the 15 percent, unless the harvest treatment would cause the lynx habitat to change to an unsuitable condition.<sup>24</sup>

#### Standard VEG S5

**Where and to what this applies:** Standard VEG S5 applies to all precommercial thinning<sup>35</sup> projects, except for fuel treatment<sup>13</sup> projects that use precommercial thinning as a tool within the wildland-urban interface as defined by the Healthy Forests Restoration Act, subject to the following limitation:

**(WUI Fuels Exemption)** Fuel treatment projects within the wildland-urban interface that do not meet Standards VEG S1, VEG S2, VEG S5, or VEG S6 may occur on no more than three percent (cumulatively) of lynx habitat on each administrative unit (a national forest or administratively combined national forests) for the life of this amendment.

For fuel treatment projects within the wildland-urban interface see guideline VEG G10.

**The Standard:** Precommercial thinning practices and similar activities intended to reduce seedling/sapling density are subject to the following limitations from the stand initiation structural stage<sup>45</sup> until the stands no longer provide winter snowshoe hare habitat.

Precommercial thinning<sup>35</sup> may occur only: **(VEG S5 Exceptions)**

1. Within 200 feet of administrative sites, dwellings, or outbuildings; or
2. For research studies<sup>39</sup> or genetic tree tests evaluating genetically improved reforestation stock; or

3. For conifer removal in aspen, or daylight thinning<sup>5</sup> around individual aspen trees, where aspen is in decline; or
4. Based on new information that is peer reviewed and accepted by the regional/state levels of the Forest Service and U.S. Fish and Wildlife Service, where a written determination states:
  - a) That a project is not likely to adversely affect lynx; or
  - b) That a project is likely to have short term adverse effects on lynx or its habitat but would result in long-term benefits to lynx and its habitat.
5. In addition to the above exceptions (and above and beyond the three percent limitation for fuels projects within the wildland-urban interface<sup>51</sup>), precommercial thinning may occur provided that:
  - a) The additional precommercial thinning does not exceed one percent of the lynx habitat in any lynx analysis unit for the life of this amendment, and the amount and distribution of winter snowshoe hare habitat within the lynx analysis unit must be provided through appropriate site-specific analysis and consultation; and
  - b) Precommercial thinning in lynx analysis units with more than 30 percent of the lynx habitat currently in the stand initiation structural stage<sup>45</sup> is limited to areas that do not yet provide winter snowshoe hare habitat <sup>52</sup>; and
  - c) Projects are designed to maintain lynx habitat connectivity<sup>16</sup> and provide snowshoe hare habitat over the long term; and
  - d) Monitoring is used to determine snowshoe hare response.

Exceptions 2 and 3 may not occur in any lynx analysis unit in which VEG S1 is exceeded (e.g., more than 30 percent of lynx analysis unit in stand initiation structural stage).

Collectively, the total area that could be impacted by exceptions 1 through 4 of VEG S5 and exceptions 1 through 3 of VEG S6 would affect no more than 0.5 percent of the lynx habitat per National Forest, based on the Incidental Take Statement in the Biological Opinion for the Southern Rockies Lynx Amendment. Projects treated under VEG S5 exception 5 are limited by the condition that pre-commercial thinning will not exceed 1 percent of lynx habitat per LAU.

Note: The VEG S5 standard is intended to provide snowshoe hare habitat while permitting some thinning, to explore methods to sustain snowshoe hare habitat over time, reduce hazardous fuels, improve forest health, and increase timber production. Project design must ensure any precommercial thinning provides an appropriate amount and distribution of snowshoe hare habitat with each lynx analysis unit over time and maintains lynx habitat connectivity within and between lynx analysis units.

Project design should focus on creating irregular shapes for the thinning units, creating mosaics of thinned and unthinned areas, and using variable density thinning, etc.

### Standard VEG S6

**Where and to what this applies:** Standard VEG S6 applies to all vegetation management<sup>50</sup> practices within multi-story mature or late successional conifer forests<sup>29</sup>, except for fuel treatment<sup>13</sup> projects within the wildland-urban interface as defined by the Healthy Forests Restoration Act<sup>17</sup>, subject to the following limitation:

Fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> that do not meet Standards VEG S1, VEG S2, VEG S5, or VEG S6 shall occur on no more than 3 percent (cumulatively) of

lynx habitat on each administrative unit (a national forest or administratively combined national forests).

For fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> see guideline VEG G10.

*From the SRLA Implementation Guide: VEG S6 applies when dense horizontal cover is present in a mature multi-story stand or late successional forest. Either the biologist or silviculturist can determine if the stand is a mature multi-storied or late successional using a suitable methodology such as that described in the Habitat Monitoring section of the Guide. A stand is considered multi-storied mature or late successional if it contains at least two layers of live vegetative structure, combined with an overstory that provides at least 40 percent canopy (mature overstory) closure\*. For the stand to be considered winter snowshoe hare habitat, there must be the presence of dense horizontal cover resulting from advanced regeneration and/or low-lying branches.*

**The Standard:** Vegetation management projects<sup>36</sup> that reduce winter snowshoe hare habitat<sup>52</sup> in multi-story mature or late successional conifer forests\*,<sup>29</sup> 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<sup>38</sup> or genetic tree tests evaluating genetically improved reforestation stock; or
- 3) For incidental removal during salvage harvest<sup>42</sup> (e.g., removal due to location of skid trails); or
- 4) Where uneven-aged management (single tree and small group selection) practices are employed to maintain and encourage multi-story attributes as part of gap dynamics. Project design must be consistent with VEG O1, O2 and O4, except where impacts to areas of dense horizontal cover are incidental to activities under this exception (e.g., construction of skid trails).

Exceptions 2 and 4 may not occur in any lynx analysis unit in which VEG S1 is exceeded.

Collectively, the total area that could be impacted by exceptions 1 through 4 of VEG S5 and exceptions 1 through 3 of VEG S6 would affect no more than 0.5 percent of the lynx habitat per National Forest, based on the Incidental Take Statement in the Biological Opinion for the Southern Rockies Lynx Amendment.

*\*When total live overstory canopy is less than or equal to 40 percent, refer instead to VEG S8 direction.*

**Standard VEGS8: Revised GMUG forest plan direction FW-STND-SPEC-35 (VEG S8):**

Salvage harvest, sanitation, or hazardous fuels treatments in high-quality habitat that does not qualify for the Southern Rockies Lynx Amendment VegS6 criteria due to overstory mortality may occur in up to 1 percent of mapped lynx habitat. This applies to all mapped lynx habitat on the GMUG and is not calculated at a Lynx Analysis Unit scale. Other treatment types are not subject to VEG S8 but must adhere to all other applicable Southern Rockies Lynx Amendment direction. **Exceptions, for which the VEG S8 cap would not apply:** 1) Vegetation management designed with the primary objective to maintain or restore lynx habitat, 2) the removal of hazard trees immediately proximal to system roads and other infrastructure, and 3) sanitation treatment of blowdown to prevent or minimize epidemic levels of insect infestations. 4: *For fuel treatment projects within the wildland-urban interface, see the existing Southern Rockies Lynx Amendment guideline VEG G10 and definition of wildland-urban interface as applied in the SRLA (plan appendix 4).*

*See also FW-GDL-ECO-07, table 5 regarding requirements for snag density and size requirements.*

VEG S8 high-quality habitat criteria include:

- 1) Overstories predominantly of dead Engelmann spruce and subalpine fir, or either species, with a sub-canopy layer dominated by subalpine fir, or a combination of either Engelmann spruce or aspen, or both (see plan appendix 12, *Footnotes Regarding Best Available Scientific Information*),
- 2) Total live overstory canopy cover less than or equal to 40 percent\*, and
- 3) Understory horizontal cover<sup>19</sup> density from ground level to 3 meters above ground level is greater than or equal to 45 percent during winter foraging conditions for snowshoe hares.

*\*When total live overstory canopy exceeds 40 percent, but criteria 1 and 3 are still met, refer instead to VEG S6 direction.*

All vegetation management activities in VEG S8 stands shall be tracked for the life of the forest plan decision. Reporting for tracked activities must:

- 1) Quantify acres for which a reduction in horizontal cover occurs;
- 2) Quantify acres converted to a Stand Initiation Structural Stage;
- 3) Use results of field verification of VEG S8-qualifying habitat during project-level site assessments to determine 1) if modeling used in the plan final EIS adequately captures high-quality lynx habitat, and 2) whether any adjustments to the use of the VEG S8 should be made by the Forest Service to increase certainty about the level of effect that the standard's 1% allowance may have on lynx;
- 4) Seek technical assistance from USFWS to assess habitat conditions in blowdown areas treated under the VEG S8 exception 3.
- *See also forest plan Canada lynx management approaches regarding how to prioritize harvest in lynx habitat and integrate lynx habitat objectives in vegetation management prescriptions. For supporting science, see section "Background Information – VEG S8", below and plan appendix 12, "Footnotes Regarding Best Available Scientific Information".*

#### Guideline VEG G1

Vegetation management<sup>50</sup> projects<sup>36</sup> should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available.

Priority for treatment should be given to stem exclusion, closed-canopy structural stage<sup>46</sup> stands to enhance habitat conditions for lynx or their prey (e.g., mesic, monotypic lodgepole stands). Winter snowshoe hare habitat<sup>52</sup> should be near denning habitat<sup>6</sup>.

#### Guideline VEG G4

Prescribed fire<sup>34</sup> activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.

#### Guideline VEG G5

Habitat for alternate prey species, primarily red squirrel<sup>37</sup>, should be provided in each lynx analysis unit.

Guideline VEG G10

Fuel treatment projects<sup>36</sup> within the wildland-urban interface<sup>51</sup> as defined by the Healthy Forests Restoration Act<sup>17</sup> should be designed considering Standards VEG S1, S2, S5, S6, and S8 to promote lynx conservation.

Guideline VEG G11

Denning habitat<sup>6</sup> should be distributed in each lynx analysis unit 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 lynx analysis unit, then projects<sup>36</sup> should be designed to retain some coarse woody debris<sup>4</sup>, piles, or residual trees to provide denning habitat<sup>6</sup> in the future.

LIVESTOCK MANAGEMENT (GRAZ): The following objectives and guidelines apply to grazing projects in lynx habitat in lynx analysis units in occupied habitat. They do not apply to linkage areas.

Objective<sup>30</sup> GRAZ O1

Manage livestock grazing to be compatible with improving or maintaining<sup>26</sup> lynx habitat<sup>23</sup>.

Guideline<sup>15</sup> GRAZ G1

In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.

Guideline GRAZ G2

In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.

Guideline GRAZ G3

In riparian areas<sup>41</sup> and willow carrs<sup>3</sup>, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages<sup>28</sup>, similar to conditions that would have occurred under historic disturbance regimes.

Guideline GRAZ G4

In shrub-steppe habitats<sup>43</sup>, livestock grazing should be managed in the elevation ranges of forested lynx habitat in lynx analysis units<sup>21</sup>, 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 in occupied habitat, subject to valid existing rights. They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.

Objective<sup>30</sup> HU O1

Maintain<sup>26</sup> the lynx’s natural competitive advantage over other predators in deep snow, by discouraging the expansion of snow-compacting activities in lynx habitat<sup>23</sup>.

Objective HU O2

Manage recreational activities to maintain lynx habitat and connectivity<sup>16</sup>.



Objective HU O3

Concentrate activities in existing developed areas, rather than developing new areas in lynx habitat.

Objective HU O4

Provide for lynx habitat needs and connectivity when developing new or expanding existing developed recreation<sup>9</sup> sites or ski areas.

Objective HU O5

Manage human activities, such as special uses, mineral and oil and gas exploration and development, and placement of utility transmission corridors, to reduce impacts on lynx and lynx habitat.

Objective HU O6

Reduce adverse highway<sup>18</sup> effects on lynx by working cooperatively with other agencies to provide for lynx movement and habitat connectivity<sup>16</sup>, and to reduce the potential for lynx mortality.

Guideline<sup>15</sup> HU G1

When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris<sup>4</sup>, so winter snowshoe hare habitat<sup>51</sup> 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 development and recreational operational uses should be planned to provide for lynx movement and to maintain the effectiveness of lynx habitat<sup>23</sup>.

Guideline HU G4

Remote monitoring of mineral and energy development sites and facilities should be encouraged to reduce snow compaction.

Guideline HU G5

A reclamation plan should be developed (e.g., road reclamation and vegetation rehabilitation) for closed mineral and energy development sites and facilities that promote the restoration of lynx habitat.

Guideline HU G6

Methods to avoid or reduce effects to lynx habitat connectivity<sup>16</sup> should be used when upgrading unpaved roads to maintenance levels 4 or 5<sup>27</sup>, where the result would be increased traffic speeds and volumes or contribute to development or increases in human activity.

Guideline HU G7

New permanent roads should not be built on ridgetops and saddles, or in areas identified as important for lynx habitat connectivity<sup>16</sup>. New permanent roads and trails should be situated away from forested stringers.

Guideline HU G8

Cutting brush along low-speed, low-traffic-volume roads<sup>25</sup> should be done to the minimum level necessary to provide for public safety.

**Guideline HU G9**

If project level analysis determines that new roads adversely affect lynx, then public motorized use should be restricted. Upon project<sup>36</sup> completion, these roads should be reclaimed or decommissioned, if not needed for other management objectives.

**Guideline HU G10**

Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction<sup>1</sup>, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on a lynx analysis unit basis, or on a combination of immediately adjacent lynx analysis units.

This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12.

Use the same analysis boundaries for all actions subject to this guideline.

**Guideline HU G11**

When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat<sup>10</sup>.

**Guideline HU G12**

Winter access for non-recreation special uses and mineral and energy exploration and development should be limited to designated routes<sup>8</sup> or designated over-the-snow routes<sup>7</sup>.

**LINKAGE AREAS (LINK):** The following objective, standard, and guidelines apply to all projects within linkage areas in occupied habitat, subject to valid existing rights.

**Objective<sup>30</sup> LINK O1**

In areas of intermingled land ownership, work with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions to reduce the potential of adverse impacts on lynx and lynx habitat.

**Standard<sup>44</sup> LINK S1**

When highway<sup>18</sup> or forest highway<sup>12</sup> construction or reconstruction is proposed in linkage areas<sup>22</sup>, identify potential highway crossings.

**Guideline<sup>15</sup> LINK G1**

National Forest System lands should be retained in public ownership.

**Guideline LINK G2**

Livestock grazing in shrub-steppe habitats<sup>43</sup> should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages<sup>28</sup>, similar to conditions that would have occurred under historic disturbance regimes.

**Required Monitoring**

1. Maps of the location and intensity of snow-compacting activities and designated and groomed routes that occurred inside lynx analysis units during the period of 1998 to 2000 constitute baseline snow compaction. Changes in activities and routes are to be monitored every five years after the decision.

2. When fuels treatment and vegetation management project decisions are signed, report the following:
  - a) Acres of fuels treatment in lynx habitat by national forest and lynx analysis unit, and whether the treatment is within or outside the wildland-urban interface as defined by the Healthy Forests Restoration Act.
  - b) Whether or not the fuels treatment met the vegetation standards or guidelines. If standard(s) were not met, report which standard(s) was not met, why it could not be met, and how many acres were affected.
  - c) Tracking of VEG S1:
    - a. Report acres and percent of each lynx analysis unit in an unsuitable condition<sup>24</sup>. Report the type of activity converting habitat to an unsuitable condition.
  - d) Application of exceptions in Standard VEG S5:
    - a. For areas where any of the exceptions 1 through 5 listed in Standard VEG S5 were applied, report the type of activity, the number of acres, and the location (by unit, and lynx analysis unit) and whether or not Standard VEG S1 was within the allowance.
  - e) Application of exceptions in Standard VEG S6:
    - a. For areas where any of the exceptions 1 through 4 listed in Standard VEG S6 were applied, report the type of activity, the number of acres, and the location (by unit, and lynx analysis unit) and whether or not Standard VEG S1 was within the allowance.
    - b. Total acres of lynx habitat treated under exemptions and exceptions to vegetation standards, to assure the 4.5 percent limit is not exceeded on any national forest over the life of the amendment (15 years).
  - f) Application of exceptions in Standard VEG S8:
    - a. For areas where exceptions under VEG S8 were applied, report the type of activity, the number of acres, and the location (by lynx analysis unit) and whether or not Standard VEG S1 was within the allowance. The exemption for fuels treatments within the wildland-urban interface are grouped with reporting for VEG S1, S2, S5 and S6.
3. Application of guidelines:
  - a) Summarize what guideline(s) was not followed and why.
  - b) Document the rationale for deviations to guidelines.

## Background Information – VEG S8 Standard

Additional direction is needed to address the continued recovery of Canada lynx due to habitat conditions associated with the spruce beetle outbreak in the spruce-fir ecosystem, and to incorporate updated science on Canada lynx. This direction supplements management direction in the Southern Rockies Lynx Amendment: standard VEG S8 would be added. Consistent with the entirety of the Southern Rockies Lynx Amendment, the direction is intended to retain existing high-quality habitat while encouraging vegetation management in areas where habitat quality for lynx and snowshoe hare can be improved in the long-term. The overall goal is to maintain areas that support high densities of snowshoe hare while promoting vegetation management that restores habitat and landscape connectivity for lynx movement.

While the science at the time of the creation of the Southern Rockies Lynx Amendment (2008) suggested that the highest quality lynx habitat would not occur in stands with a dead overstory, and so therefore did not provide protections for such stands, the spruce beetle epidemic in the Rio Grande and GMUG National Forests in recent years offered the opportunity to test this assumption (Squires et al. 2020). Therefore, VEG S8 is designed to limit tree harvest in high-quality lynx habitat affected by the spruce-beetle epidemic. Forest stands that have experienced overstory tree mortality for which Southern Rockies Lynx Amendment Standard VEG S6 no longer applies (due to stands no longer meeting the definition of multi-storied since the overstory trees are now dead) no longer have habitat direction from the Southern Rockies Lynx Amendment that applies to them due to the changed forest condition. VEG S8 is intended to fill this gap.

Based on snowshoe hare pellet count data collected in 2018, 2019, and 2020 in spruce stands affected by the spruce beetle epidemic, mean snowshoe hare density was highest in unmanaged sites followed by previously managed sites, and lowest in salvage sites. Unmanaged and previously managed stands both contained dead overstory and live advanced regeneration, while the dead overstory had been removed from the salvage areas. Comparisons between treatments were not statistically different in 2018 and 2019. In 2020, mean hare density in salvage sites was significantly different (lower) compared to unmanaged and previously managed sites. The Science Team interpretation states, "Based on these variable results, exploration of options to mitigate impacts to dense horizontal cover during salvage should be considered. It is critical to continue to steer salvage away from high-quality Canada lynx habitat" (The Spruce Beetle Epidemic-Aspen Decline Management Response Project (SBEADMR) Science Team Monitoring Questions, Results, and Interpretation from January 2022). *See also plan appendix 12, Footnotes Regarding Best Available Scientific Information.*

Vegetation management activities have the potential to both benefit and adversely affect lynx and snowshoe hare habitat and populations (Interagency Lynx Biology Team 2013, p. 71). Most vegetation management activities reduce overstory canopy cover and understory horizontal cover, potentially reducing snowshoe hare densities and habitat values for Canada lynx. Conversely, vegetation management that integrates biologically meaningful habitat objectives will likely benefit snowshoe hare and lynx habitat values.

Standard VEG S8 applies to salvage harvest, sanitation, and hazardous fuels reduction activities conducted in conifer forests that represent high-quality habitat for lynx, but no longer meet the criteria for the original Southern Rockies Lynx Amendment standard VEG S6 due to overstory mortality and associated forest structural changes. These forest stands still provide high-quality habitat characterized by dense horizontal cover<sup>19</sup> and include forest structure that provides cover and food for snowshoe hares, and foraging habitat, traveling, and hiding cover for Canada lynx.

VEG S8 high-quality habitat criteria include:

- 1) Overstories predominantly of dead Engelmann spruce and subalpine fir, or either species, with a sub-canopy layer dominated by subalpine fir, or a combination of either Engelmann spruce or aspen, or both,
- 2) Total live overstory canopy cover less than or equal to 40 percent, and
- 3) Understory horizontal cover<sup>19</sup> density from ground level to 3 meters above ground level is greater than or equal to 45 percent during winter foraging conditions for snowshoe hares.

Areas that meet the VEG S8 criteria should be avoided where possible. If entry does occur, minimize reduction of key habitat values consistent with best management practices for vegetation management in lynx habitat and within the 1 percent allowance per the standard.

## Lynx Amendment Glossary

<sup>1</sup> *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 were first determined based on the acreage or miles used during the period 1998 to 2000.

<sup>2</sup> *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. (Lynx Conservation Assessment and Strategy)

<sup>3</sup> *Carr* – Deciduous woodland or shrub land occurring on permanently wet, organic soil. (Lynx Conservation Assessment and Strategy)

<sup>4</sup> *Coarse woody debris* – Any piece(s) of dead woody material (e.g., dead boles, limbs, and large root masses on the ground or in streams). (Lynx Conservation Assessment and Strategy)

<sup>5</sup> *Daylight thinning* – Daylight thinning is a form of precommercial thinning that removes the trees and brush inside a given radius around a tree.

<sup>6</sup> *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.

<sup>7</sup> *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.

<sup>8</sup> *Designated route* – A designated route is a road or trail that has been identified as open for specified travel use.

<sup>9</sup> *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.

<sup>10</sup> *Diurnal security habitat (lynx)* – Places in lynx habitat that provide secure winter bedding sites in highly disturbed landscapes such as ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Site characteristics and stand conditions make human access difficult and discourage human activity. Security habitats are sufficiently large to provide effective visual and acoustic insulation and to let lynx easily move away from any intrusion. Lynx security habitat must be in proximity to winter snowshoe hare habitat. (Lynx Conservation Assessment and Strategy)

<sup>11</sup> *Fire use* – At the time of the 2008 SRLA, fire use was the term used to encompass the combination of wildland fire use and using prescribed fire to meet resource objectives (National Interagency Fire Center). Wildland fire use was the term for the management of naturally ignited wildland fires to accomplish resource management objectives in areas that have a fire management plan. At the time of the plan decision, the contemporary equivalent is that there are multiple objectives for natural-caused wildfires.

<sup>12</sup> *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 Forest Service, state transportation agency, and Federal Highway Administration.

<sup>13</sup> *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.

<sup>14</sup> *Goal* – A goal is a broad description of what an agency is trying to achieve, found in a land management plan. (Lynx Conservation Assessment and Strategy)

<sup>15</sup> *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. (Lynx Conservation Assessment and Strategy modified)

<sup>16</sup> *Habitat connectivity (lynx)* – Cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian communities may provide cover across open valley floors. (Lynx Conservation Assessment and Strategy)

<sup>17</sup> *Healthy Forests Restoration Act* – Public Law 108-148, passed in December 2003. The Healthy Forests Restoration Act 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 Healthy Forests Restoration Act website.)

<sup>18</sup> *Highway* – The word highway includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

<sup>19</sup> *Horizontal cover* – The visual obscurity provided by vegetation that extends to the ground or snow surface, primarily provided by tree stems and tree boughs, but may also be provided by shrubs, herbaceous vegetation, and landscape topography.

For the purpose of the GMUG forest plan revision, high-quality horizontal cover is defined as 45 percent or greater.

<sup>21</sup> *Lynx Analysis Unit* – A lynx analysis unit is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (Lynx Conservation Assessment and Strategy). A lynx analysis unit is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

<sup>22</sup> *Linkage area* – A linkage area provides landscape connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where blocks of lynx habitat are separated by intervening areas of non-lynx habitat such as basins, valleys, or agricultural lands, or where lynx habitat naturally narrows between blocks. (Lynx Conservation Assessment and Strategy updated definition approved by the Steering Committee 10/23/01)

<sup>23</sup> *Lynx habitat* – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the southern Rocky Mountains, lynx habitat generally occurs between 8,000 and 12,000 feet in elevation. Primary vegetation consists of Engelmann spruce, subalpine fir, aspen-conifer mix and lodgepole pine on spruce-fir habitat types. On cool moist sites, Douglas-fir and aspen, when interspersed with subalpine forests, may also contribute to lynx habitat. Dry forest types (e.g., ponderosa pine, climax lodgepole pine) do not provide lynx habitat. (Lynx Conservation Assessment and Strategy)

<sup>24</sup> *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, insect epidemics 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. (Lynx Conservation Assessment and Strategy)

For the GMUG forest plan, habitat with horizontal cover 24 percent or less will be considered as unsuitable.

<sup>25</sup> *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.

<sup>26</sup> *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.

<sup>27</sup> *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 have double lanes and are paved, but some may be aggregate surfaced with the dust abated.

<sup>28</sup> *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.

<sup>29</sup> *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.

<sup>30</sup> *Objective* – An objective is a statement in a land management plan describing desired resource conditions and intended to promote achieving programmatic goals. (Lynx Conservation Assessment and Strategy)

<sup>31</sup> *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)

<sup>32</sup> *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.

<sup>33</sup> *Permanent development* – Any development that results in a loss of lynx habitat for at least the duration of a forest plan, approximately 15 years. Ski trails, parking lots, new permanent roads, structures, campgrounds, and many special use developments would be considered permanent developments.

<sup>34</sup> *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 National Environmental Policy Act requirements met, before ignition. The term prescribed fire replaces the term management ignited prescribed fire. (National Wildfire Coordination Group)

<sup>35</sup> *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)

<sup>36</sup> *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 environmental impact statement 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 environmental impact statement 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*.

<sup>37</sup> *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.

<sup>38</sup> *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)

<sup>39</sup> *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 national forest budget.

<sup>40</sup> *Restore, restoration* – To restore is to return or re-establish ecosystems or habitats to their original structure and species composition. (Dictionary of Forestry)

<sup>41</sup> *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. (Lynx Conservation Assessment and Strategy)



<sup>42</sup> *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.

<sup>43</sup> *Shrub steppe habitat* – Shrub steppe habitat consists of dry sites with shrubs and grasslands intermingled.

<sup>44</sup> *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.

<sup>45</sup> *Stand initiation structural stage* – The stand initiation stage generally develops after a stand-replacing disturbance by fire, insects, 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)

<sup>46</sup> *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)

<sup>47</sup> *Timber management* – Timber management consists of growing, tending, commercially harvesting, and regenerating crops of trees.

<sup>48</sup> *Uneven-aged timber management* - Uneven-aged management develops a stand with trees of three or more distinct age classes, either intimately mixed or in small groups of 2 acres or less (based on *The Dictionary of Forestry* Helms, 1998). Group openings do not exceed 20 percent of the stand in a single entry, but individual tree selection can occur throughout an entire stand or between the groups.

<sup>49</sup> *Understory reinitiation structural stage* – In the understory reinitiation 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)

<sup>50</sup> *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.

<sup>51</sup> *Wildland-urban interface* – Use the definition of wildland-urban interface found in the Healthy Forests Restoration Act. The full text can be found at Healthy Forests Restoration Act 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 wildland-urban interface 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 Healthy Forests Restoration Act. For full text see Healthy Forests Restoration Act 101.)

<sup>52</sup> *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 (Lynx Conservation Assessment and Strategy). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stages.

## Appendix 5. Relevant Federal Statutes, Regulations, Policies, and Agreements

There are multiple sources of management direction for National Forest System lands. National and regional direction includes laws, Executive orders, regulations, and Forest Service policies. Management direction that ranges from national and regional direction to forest plan direction, as well as project-level decisions is illustrated in figure 5.

Overall, every effort has been made to not repeat existing laws, regulations, and policies within forest plan components, except to explicitly emphasize some direction in response to public comment, and/or where required by the 2012 planning rule.



**Figure 5. Multiple tiers of national forest management direction**

## Federal Statutes

Applicable Federal statutes that forest management comply with are listed in table 40.

**Table 39. Federal statutes applicable to forest management**

Title	Initiation
Agriculture Appropriations Act	May 23, 1908
Alaska National Interest Lands Conservation Act	December 2, 1980
American Indian Religious Freedom Act	August 11, 1978
American with Disabilities Act	1990
Anderson-Mansfield Reforestation and Revegetation Act	October 11, 1949
Antiquities Act	June 8, 1906
Archeological Resources Protection	October 31, 1979
Architectural Barriers Act	1968
Bankhead-Jones Farm Tenant Act	July 22, 1937
Bald and Golden Eagle Protection Act	June 8, 1940, amended 1962
Cabin Fee Act	December 22, 2014
Carson-Foley Act of 1968 (PL 92-516)	
Clarke McNary Act	June 7, 1924
Clean Air Act	August 7, 1977; Amendments of 1977 and 1990
Clean Water Act	1948; amended in 1972, 1977, 1981, and 1987
Color of Title Act	December 22, 1928
Cooperative Forestry Assistance Act	July 1, 1978
Department of Agriculture Organic Act	August 3, 1956
Disaster Relief Act	May 22, 1974
Emergency Flood Prevention Act (Agricultural Credit Act)	August 4, 1978
Endangered Species Act	December 28, 1973
Energy Policy Act	August 8, 2005
Energy Security Act	June 30, 1980
Executive Order 13112	1999
Federal Advisory Committee Act	October 6, 1972
Federal Aid Highway Act	
Federal Cave Resources Protection Act	November 18, 1988
Federal Insecticide Rodenticide, and Fungicide Act	October 21, 1972
Federal Land Exchange Facilitation Act	August 20, 1988

<b>Title</b>	<b>Initiation</b>
Federal Land Policy and Management Act	October 21, 1976
Federal Lands Recreation Enhancement Act	2004
Federal Noxious Weed Act	January 3, 1975
Federal Power Act	June 10, 1920
Federal Records Act	September 5, 1950
Federal-State Cooperation for Soil Conservation Act	December 22, 1944
Federal Water Pollution Control Act	July 9, 1956, as amended (Water Quality Act of 1965, Clean Water Restoration Act of 1966)
Federal Water Project Recreation Act	July 9, 1965
Fish and Wildlife Conservation Act	September 15, 1960
Fish and Wildlife Coordination Act	March 10, 1934
Forest and Rangeland Renewable Resources Planning Act	August 17, 1974
Freedom of Information Act	November 21, 1974
General Exchange Act	March 20, 1922
General Mining Act	1872
Geothermal Steam Act	1970
Granger-Thye Act	April 24, 1950
Healthy Forest Restoration Act	April 7, 1989
Highway Safety Act	September 9, 1966
Historic and Archaeological Data Preservation Act	May 24, 1974
Historical Sites Act	August 21, 1935
Knutson-Vandenberg Act	June 9, 1930
Land Acquisition Act	March 3, 1925
Land Acquisition-Declaration of Taking Act	February 26, 1931
Land and Water Conservation Fund Act	September 3, 1964
Law Enforcement Authority Act	March 3, 1905
Migratory Bird Treaty Act	1918
Mineral Leasing Act	February 25, 1920, as amended
Mineral Leasing for Acquired Lands Act	August 11, 1955
Mineral Materials Act	July 31, 1947
Multiple-Use Sustained Yield Act	June 12, 1960
National Environmental Policy Act	January 1, 1970
National Energy Conservation Policy Act	1978
National Forest Management Act	October 22, 1976

Title	Initiation
National Forest Roads and Trails Act	October 13, 1964
National Forest Ski Area Permit Act	1986
National Historic Preservation Act	October 15, 1966, as amended
National Trails System Act	October 2, 1968
Native American Graves Protection and Repatriation Act	January 23, 1990
Occupancy Permits Act	March 4, 1915
Organic Administration Act	June 4, 1897
Paleontological Resources Preservation Act	2009
Petrified Wood Act	1962
Pipelines Act	February 25, 1920
Public Lands Surveys Act	August 30, 1899
PL 102-575 – Reclamation Projects Authorization and Adjustment Act of 1992	October 30 1992
Real Property Quiet Title Action Act	October 25, 1992
Rehabilitation Act	1973, as amended
Renewable Resources Improvement Act	June 30, 1978
Research Grants Act	September 6 ,1958
Right of Eminent Domain Act	August 1, 1888
Rural Development Act	August 30, 1972
Safe Drinking Water Act	November 16, 1977, and Amendments
Secure Rural Schools and Community Self-Development Act	2000
Sikes Act	September 16, 1960
Sisk Act	December 4, 1967
Small Tracts Act	January 12, 1983
Soil and Water Resources Conservation Act	November 18, 1977
Solid Waste Disposal (Resources Conservation and Recovery Act) Act	October 21, 1976
Supplemental National Forest Reforestation Fund Act	September 19, 1972
Surface Mining Control and Reclamation Act	August 3, 1977
Surface Transportation Assistance Act	1978
Surface Use Act	1955
Timber Export Act	March 4, 1917
Timber Exportation Act	April 12, 1926
Title Adjustment Act	April 28, 1930
Toxic Substances Control Act	October 11, 1976

Title	Initiation
Transfer Act	February 1, 1905
Uniform Federal Accessibility Standards	1968
Uniform Relocation Assistance and Land Acquisition Policies Act	January 2, 1971
U.S. Criminal Code (Title 18 USC chapter 91, Public Lands)	June 25, 1948
Volunteers in the National Forests Act	May 18, 1972
Water Quality Improvement Act	April 3, 1965
Water Resources Planning Act	July 22, 1965
Watershed Protection and Flood Prevention Act	August 4, 1954
Wild and Scenic Rivers Act	October 2, 1968
Wildfire Suppression Assistance Act	2003
Wilderness Act	September 3, 1964
Wood Residue Utilization Act	December 19, 1980
Youth Conservation Corps Act	August 13, 1970

## Regulations

The national forests also abide by regulations listed in, but not limited to those in, table 41 as they pertain to the Forest Service.

**Table 40. Regulations applicable to forest management**

CFR	Title
36 CFR 60	National Register of Historic Places
36 CFR 63	Determinations of Eligibility for Inclusion in the National Register of Historic Places
36 CFR 68	Secretary of the Interior's Standards for the Treatment of Historic Places
36 CFR 79	Curation of Federally Owned and Administered Archeological Collections
36 CFR 212	Forest Development Transportation System
36 CFR 213	Administration Under Bankhead-Jones Act
36 CFR 219	Planning Rule
36 CFR 220	National Environmental Policy Act
36 CFR 221	Timber Management Planning
36 CFR 223	Sale and Disposal of National Forest System Timber
36 CFR 228	Minerals
36 CFR 241	Fish and Wildlife
36 CFR 251	Land Uses
36 CFR 254	Landownership Adjustments
36 CFR 261	Prohibitions

CFR	Title
16 U.S.C. 470 mm	Archeological Resources Protection
P.L. 114-35	Cave Resources Protection Act
36 CFR 291	Occupancy and Use of Developed Sites and Area of Concentrated Public Use
36 CFR 293	Wilderness Primitive Areas
36 CFR 294	Special Areas, including Subpart D, Colorado Roadless Area Management
36 CFR 295	Use of Motor Vehicles off Forest Development Roads
36 CFR 296	Archeological Resources Protection Act Uniform Regulations
36 CFR 297	Wild and Scenic Rivers
36 CFR 800	Protection of Historic Properties
36 CFR 1222-1238	Federal Records Act Uniform Regulations
40 CFR 121-135	Watersheds Programs
40 CFR 1500-1508	Council on Environmental Quality
	Guidance for Implementation of Federal Wildland Fire Management Policy (2009)
P.L. 108-148	The Healthy Forest Restoration Act
	Interagency Prescribed Fire Planning and Implementation Procedures Guide (2014)
NFES 2724	Interagency Standards for Fire and Fire Aviation Operations
PMS 484	National Cohesive Wildland Fire Management Strategy (2014)
43 CFR Part 10	Native American Graves Protection and Repatriation Act
43 CFR 8340	Off-road Vehicles
42 U.S.C. 7401	National Ambient Air Quality Standards
NFPA 70	National Electrical Code
NFPN70B	National Fire Code
	USDA Forest Service National Fire Plan (2000)
2000	Uniform Building Code
7 CFR 15e	Enforcement of Nondiscrimination
28 CFR 36	Nondiscrimination on the Basis of Disability by Public Accommodation and in Commercial Facilities



## Executive Orders

Executive orders applicable to forest management are recorded in table 42.

**Table 41. Applicable Executive orders**

Executive Order Number	Title
11593	Protection and Enhancement of the Cultural Environment
11990	Protection of Wetlands
11990	Protection of Wetlands
11988	Floodplain Management
12088	Federal Compliance with Pollution Control Standards
12898	Environmental Justice
12962	Recreational Fisheries
13007	Indian Sacred Sites
13175	Consultation and Coordination with Indian Tribal Governments
13186	Migratory Bird Protection
13287	Preserve America
13751	Invasive Species Management, as amended
14008	Tackling the Climate Crisis at Home and Abroad ("30 x 30")
14072	Mature and Old Growth

## Policies and Guidelines

The forest plan will follow all applicable policies and guidelines, including:

- All Forest Service Manuals
- All Forest Service Handbooks
- Secretary of the Interior's Standards Guidelines for Archaeology and Historic Preservation
- USDA Forest Service Strategic Plan: FY 2015–2020 or most current version

## State and Local Direction

State and local direction applicable to forest management includes:

- Colorado Air Quality Protection Act
- Water Division 4 and 5, Water Decrees Forestwide
- Memorandum of Understanding between the Forest Service and the Natural Resource Conservation Service for permitting and operating SNOTEL, SCAN, and manual snow survey sites
- Memorandum of Understanding between the Forest Service and the State of Colorado Department of Public Health and Environment for management of water quality in State of Colorado-defined Source Water Assessment Areas on National Forest System lands in Colorado

- Memorandum of Understanding between the Forest Service and the State of Colorado Department of Natural Resources and the Colorado Water Conservation Board to establish a framework for the parties to work together in a cooperative manner on issues regarding the management of water and water uses on National Forest System lands in Colorado
- Conservation agreement and strategy for Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) in the States of Colorado, Utah, and Wyoming (June 2006)
- Range-wide conservation agreement and strategy for roundtail chub (*Gila robusta*), bluehead sucker (*Catostomus discobolus*), and flannelmouth sucker (*Catostomus latipinnis*) (September 2006)
- Conservation plan and agreement for the management and recovery of the Southern Rocky Mountain population of the boreal toad (*Bufo boreas boreas*) (February 2001). Note: as of 2023, now known as the “western toad”
- Policies and guidelines for fish and wildlife management in National Forest and Bureau of Land Management wilderness (as amended June 2006)

## Programmatic Decisions

- Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (USDI BLM and USDA Forest Service 2008)
- Programmatic Environmental Impact Statement for West-wide Energy Corridors (USDA Forest Service 2009)

## Appendix 6. Old Forest Characteristics

Old forest, or late-successional stage forest, is dominated by late seral or climax species of a particular size, and has other characteristics such as snags, canopy layers, downed woody material, and trees with rotten, dead, or broken tops. Old forest characteristics for the GMUG's primary forested ecosystems are detailed in the following tables: spruce-fir, table 43; cool-moist and warm-dry mixed conifer, table 44; southwest ponderosa pine, table 45; lodgepole, table 46; aspen, table 47; spruce-fir-aspen, table 48; pinyon-juniper, Table 49. These have been modified from Mehl (1992) to reflect conditions in the Grand Mesa, Uncompahgre, and Gunnison National Forests. "Old" age varies between sites for the same ecosystem type (Mehl 1992), however, at the time of the plan decision, in fulfillment of Executive Order 14072, the Forest Service has published a technical report with definitions of old growth for Region 2 that include a defined age (USDA Forest Service, 2023). These ages have been included in the table below; but note that aspen is corrected to 100 years, not 200 as incorrectly printed in the technical report (Rebain, pers. comm.). Features of "old growth" in the planning area and broader region are described in length in Mehl 1992:

Structural features that characterize old growth in the central and southern Rocky Mountains and Southwest vary widely according to forest type, climate, site conditions, and disturbance regime. Old growth is characteristically distinguished from younger growth by some but not necessarily all of the following attributes:

- Large trees for species and site.
- Wide variation in tree sizes and spacing between trees.
- Relative to earlier stages, high accumulations of large, dead standing and fallen trees.
- Decay in the form of broken and deformed tops or bole and root rot.
- Multiple canopy layers.
- Canopy gaps and understory patchiness.

"Old" is not necessarily virgin or primeval. Structure and function of an old-growth ecosystem may be influenced by its stand size and landscape position. Given sufficient time, old growth can develop following human or natural disturbances, such as logging or wildfire.

These tables reflect both best available scientific information with both 1) metrics that can be used to help identify old forest, and 2) qualitative, descriptive attributes that could be verified in the field and inform understanding and management. This content should be used with other existing and future data, such as remotely sensed products, to inventory and field-validate old forest in the GMUG.

*See particularly associated plan direction FW-GDL-ECO-07, FW-DC-ECO-08, FW-GDL-SPEC-11, the management approaches for Old Forest (FW-MA-ECO-08.a and ECO-08.b), in plan section Key Ecosystem Characteristics.*

**Table 42. Spruce-fir old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	16
Minimum number of trees per acre	10
Minimum overstory canopy cover	40
Variation in tree diameter	Yes
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	Yes
Minimum canopy closure (including overstory)	60
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	10
Number of trees per acre	3
Down	
Minimum pieces per acre	Some
<b>Additional Attributes</b>	
Large-tree age	200
Trees in upper canopy are slow growing	Yes
Net growth near zero	Yes
Patchiness	Yes
Many stages of decomposition	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Wide range of tree vigor	Yes
Distinctive bark	Yes

**Table 43. Cool-moist and warm-dry mixed conifer old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	16
Minimum number of trees per acre	10
Variation in tree diameter	Yes
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	No
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	10
Number of trees per acre	2
Down	
Minimum pieces per acre	Some
<b>Additional Attributes</b>	
Large-tree age	200
Trees in upper canopy are slow growing	Yes
Wide range of tree vigor	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Multiple tree canopy layers	Yes
Patchiness	Yes

Canopy closure criteria was not included so that more open stands (fire-maintained open) would not be overlooked (table 45, table 46).

**Table 44. Southwest ponderosa pine old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	18
Minimum number of trees per acre	10

Attribute	Definition
Variation in tree diameter	Yes
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	No
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	10
Number of trees per acre	2
Down	
Minimum pieces per acre	Some
<b>Additional Attributes</b>	
Large-tree age	200
Trees in upper canopy are slow growing	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Distinctive bark	Yes
Down dead trees	Yes
Distinctive crowns	Yes
Mosaic of age class patchiness	Yes

**Table 45. Lodgepole old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	12
Minimum number of trees per acre	10
Variation in tree diameter	No
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	No
Minimum total live canopy closure (percent)	60
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	8
Number of trees per acre	2
Down	

Attribute	Definition
Minimum pieces per acre	Some
<b>Additional Attributes</b>	
Large-tree age	150
Trees in upper canopy are slow growing	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Net growth near zero	Yes
Multiple tree canopy layers	Yes
Multiple tree species	Yes
Patchiness	Yes
Many stages of decomposition	Yes
Distinctive crowns in the upper canopy	Yes

**Table 46. Aspen old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	14
Minimum number of trees per acre	20
Variation in tree diameter	No
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	No
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	No
Number of trees per acre	No
Down	
Minimum pieces per acre	No
<b>Additional Attributes</b>	
Large-tree age	100
Trees in upper canopy are slow growing	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Multiple tree canopy layers	Yes

Attribute	Definition
Standing dead trees 10 inch plus DBH	Yes
Down dead trees	Yes
Variation in tree diameters	Yes

Attributes such as live trees will need to be identified and additional work done to differentiate quality old growth in rankings (e.g., differentiate canopy closure as a quality attribute as later stages of aspen old growth (table 47) can have less canopy closure than earlier stages).

**Table 47. Spruce-fir-aspen old forest characteristics**

[DBH, diameter at breast height]

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum DBH (inches)	16
Minimum number of trees per acre	10
Aspen and conifer codominant in overstory	Yes
Variation in tree diameter	Yes
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	Yes
Minimum total live canopy closure (percent)	60
<b>Dead Trees</b>	
Standing	
Minimum DBH (inches)	10
Number of trees per acre	3
Down	
Minimum pieces per acre	Some
<b>Additional Attributes</b>	
Large-tree age	(Not defined in USDA 2023 technical report)
Trees in upper canopy are slow growing	Yes
Patchiness	Yes
Many stages of decomposition	Yes
<b>Quality Attributes</b>	
Above attributes in excess of minimums	Yes
Wide range of vigor	Yes



**Table 48. Pinyon-juniper old forest characteristics**

Attribute	Definition
<b>Standard Attributes</b>	
<b>Live Trees</b>	
Upper canopy – older component	
Minimum diameter at root collar (DRC) (inches)	12
Minimum number of trees per acre	30
Variation in tree diameter	Yes
Decadence – dead, broken, or deformed tops and/or bole or root rot	Yes
Multiple tree canopy layers	Yes
<b>Dead Trees</b>	
Standing	
Minimum DRC (inches)	10
Number of trees per acre	1
Down	
Minimum pieces per acre	2
<b>Additional Attributes</b>	
Large-tree age	200
Trees in upper canopy are slow growing	Yes
Canopy closure greater than 35 percent	Yes

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## Appendix 7. Watersheds: Watershed Condition Framework, Priority Watersheds, and Conservation Watershed Networks

### Watershed Condition Framework

The Forest Service uses the watershed condition framework to assess and characterize the health and condition of subwatersheds (6th level or 12-digit hydrologic unit code). The watershed condition framework employs a nationally consistent reconnaissance-level approach for classifying watershed condition, using a comprehensive set of 12 indicators that are surrogate variables representing the underlying ecological, hydrologic, and geomorphic functions and processes that affect watershed condition. Primary emphasis is on aquatic and terrestrial processes and conditions that Forest Service management activities can influence (USDA Forest Service 2011).

Watershed condition classification is the process of describing watershed condition in terms of discrete classes that reflect the level of watershed health:

- **Class 1:** Watersheds that are functioning properly exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- **Class 2:** Watersheds that are functioning-at-risk exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.
- **Class 3:** Watersheds that have impaired function exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

The GMUG has 231 6<sup>th</sup> level subwatersheds. Of these, 159 are currently identified as class 1; 72 are identified as class 2; and no watersheds are identified as class 3. Across the plan area, watersheds were most commonly rated as impaired for the indicators: aquatic biota, roads and trails, invasive species, and water quality.

Public comments on the draft forest plan noted that the scale of the 6<sup>th</sup>-level HUC can misrepresent potential smaller-scale degraded areas as “good” within its overall watershed. Targeted restoration efforts can still be completed at a smaller scale. However, the Watershed Condition Framework is the agency’s primary, larger-scale approach. One intended use of this classification process is to direct forest activities with respect to watershed restoration and forest health improvements, but it is not the only method used to maintain watershed health or direct forest restoration efforts; for example, watershed integrity ratings were used in the development of the timber suitability analysis for the forest plan (*see following section and plan appendix 8 – Timber Suitability Analysis, for more information on watershed integrity*). Species habitat needs, such as Gunnison sage-grouse, can also focus riparian restoration, as can opportunities that arise with cross-boundary partners and private landowners.

Additional information regarding the GMUG watershed condition class ratings is also available in the GMUG Watershed, Water, and Soil Resources Revised Assessment (USDA Forest Service 2018), and the watershed condition framework is available in Forest Service publication FS-977 (USDA Forest Service 2011). Additional information, maps, and documentation is available on the Forest Service watershed web page (<https://usfs.maps.arcgis.com/apps/MapSeries/index.html?appid=f4332e5b80c44874952b57e1db0b4407>).

## Watershed Integrity

In addition to evaluation of the impacts or effects of current land use (watershed condition), land managers can also assess the inherent physical attributes of the watershed (watershed integrity), which can provide insight into their potential for sensitivity to land use impacts and departure from natural hydrologic function.

The 2005 Subwatershed Condition Assessment addressed watershed integrity in the GMUG (GMUG Plan Revision Comprehensive Evaluation Report, Vol. II, Chapter 5). The premise of this evaluation was that a high degree of integrity is defined by 1) an absence of human activity and 2) the inherent characteristics of the watershed make it less vulnerable to alteration of natural processes. The inherent physical attributes of high integrity watersheds provide a higher degree of tolerance for land-use activities without suffering the effects of erosion, sedimentation, or alteration of hydrologic function. Watersheds with lower integrity are more inherently sensitive, have often been altered by land-use activities, and have areas that are not functioning within the natural range of variation.

The subwatershed integrity assessment examined physical sensitivity (e.g., erodibility of surface soils, soil depth, stream condition classification, slope, water quality, streamflow) to determine numerical integrity ratings. The results allowed for a relative comparison of physical sensitivity, and were distributed across four statistical breaks:

**Integrity Class 1** is the highest relative integrity, and subwatersheds are functioning near a natural state with minimum land-use influences. In 2005, these subwatersheds accounted for about 30 percent of the total GMUG watersheds.

- Class 1 subwatersheds provide a potential benchmark or reference for proper hydrologic function.

**Integrity Class 2** subwatersheds have land-use activities that have altered natural conditions to some extent, but hydrologic function remains in the range of historic variability. In 2005, about 35 percent of the subwatersheds fell into this class and composed about 40 percent of the GMUG.

**Integrity Class 3** subwatersheds have moderate or high activity levels coupled with moderate or high physical sensitivity and have diminished levels of natural function but are not impaired, and beneficial uses are sustained. In 2005, about 15 percent of the subwatersheds fell into this integrity class.

**Integrity Class 4** subwatersheds have the lowest relative ratings of the watersheds evaluated in the GMUG, but this relative ranking does not suggest that the entirety of these subwatersheds is impaired or unstable. These Class 4 subwatersheds have the greatest potential to have site-specific or stream-segment problems. These subwatersheds demonstrate the cumulative effects of two or three land-use activities combined with high physical sensitivity. In 2005, only 23 subwatersheds (10 percent) fell into this integrity class. These subwatersheds are dominated by historic mining impacts and also are degraded by extensive decreed water diversions. These external factors may limit the potential for restoration.

Summarily, as of 2005, approximately 60 percent of the 231 6<sup>th</sup>-level HUC subwatersheds in the GMUG were in good condition with integrity classes 1 and 2. Most watersheds function within a range of historic variability with current land-use activities (integrity classes 1-3), and only 10% of subwatersheds are likely to be beyond the range of historic variability, and have a high potential for degradation from additional land-use activities (integrity class 4). Although the integrity assessment has not been repeated in recent years, inherent physical sensitivity is a baseline condition. With respect to impacts of historic land use, restoration may positively shift integrity class ratings, but it is not expected that contemporary land management, when implemented according to forest plan direction and best management practices, would negatively impact these ratings. *See plan appendix*

8, *Timber Suitability Analysis, regarding the application of the 2005 watershed integrity ratings in that analysis process.*

Of note, in 2013, the GMUG conducted an assessment of the vulnerability of GMUG watersheds to climate change (USDA Forest Service. 2013a.), which informed the development of plan direction for infrastructure. This report assessed watersheds from yet another angle; each of these reports contribute to an understanding of watershed health.

## Priority Watersheds

The 2012 Planning Rule requires land management plans to: identify watershed(s) that are a priority for maintenance or restoration (36 CFR 219.7(f)(1)).

Identification of priority watersheds is done to focus effort on the integrated maintenance or restoration of conditions in these watershed conditions. Plan objectives for management activities and restoration would concentrate on sustaining watershed condition and function or improving watershed condition in these priority watersheds. However, selection of priority watersheds does not preclude watershed restoration efforts in other areas as driven by community interest, funding opportunities, as problems are identified, and/or if naturally occurring degradation has adversely altered watershed function. The identification of priority watersheds is intended to be helpful to Forest Service managers as they schedule work, especially in circumstances of limited budgets and resources. Changes as to which watersheds in the forest plan are “priority” are made by administrative change (sec. 21.5 of FSH 1909.12) (USDA Forest Service 2012).

The watershed condition framework uses the watershed condition class data to identify priority watersheds, to develop watershed restoration action plans for priority watersheds, them, and to implement projects to maintain or restore their condition.

At the outset of the forest plan revision process, the one identified priority watershed selected was Oh-Be-Joyful Creek – Slate River (140200010205) in the Gunnison Ranger District. Yet over the time period of the planning process, restoration actions within that watershed were completed. Two other watersheds had also been identified as priorities outside of the plan revision process: Washington Gulch – Slate River (140200010206) and Marshall Creek (140200030103). Restoration actions in these additional watersheds have been completed, improving them to properly functioning condition.

In 2022, a new set of priority watersheds were identified (table 50). All are currently functioning-at-risk, municipal watersheds, and fall within priority landscapes. Watershed restoration action plans will be developed to identify, focus, and guide actions that restore watershed processes for water quality/quantity improvement and resident fish habitat.

The prioritization process is defined as Step B of the Watershed Condition Framework. Step B provides a broad definition of direction, guidance, and policy for each national forest to consider when defining priority watersheds for each national forest. Using this framework, the GMUG’s criteria included: past Watershed Condition Assessment and Tracking Tool (WCATT) ratings – rated as Functioning-At-Risk, and rated such for factors primarily regarding aquatic threats and road densities; a municipal watershed; fuels risk ratings; waterbodies with water temperature forecasted to be at-risk by 2040 for supporting certain fish species; and presence of Gunnison sage-grouse or certain fish species (mountain sucker, flannelmouth sucker, cutthroat trout).

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**Table 49. Priority watersheds**

[HUC, hydrologic unit code; CRCT, Colorado River cutthroat trout.]

Ranger District	6 <sup>th</sup> -Level HUC	Watershed Condition Class	Key Factors	Total Subwatershed, in acres (and percentage of National Forest System land)
Grand Valley	Big Creek (140100051302)	Functioning-at-Risk	Mountain sucker (state special concern species), aquatic threats (biota, quality, habitat), at-risk water temperature for fish by 2040, road density	20,400 (75%)
Norwood	Headwaters Naturita Creek (140300030401)	Functioning-at-Risk	Aquatic threats (biota, quality and habitat), occupied designated critical Gunnison sage-grouse habitat, at-risk water temperature for fish by 2040, road density	56,100 (28%)
Ouray	Headwaters Uncompahgre River (140200060203)	Functioning-at-Risk	Aquatic threats (biota, quality), at-risk water temperature for fish by 2040, road density, municipal water for the City of Ouray	25,800 (71%)

Future priority watersheds will be determined based on aquatic habitat needs, conservation watershed network criteria in the forest plan, the watershed condition framework, and total maximum daily load status.

There will continue to be management emphasis on all watersheds where a major portion of a domestic water supply is on National Forest System lands. These watersheds typically are classified as “good” under the Watershed Condition Classification, and effort will be made to sustain those watersheds in that condition. Management activities in those watersheds will minimize impacts on water quality and water supply.

## Conservation Watershed Networks

Conservation watershed networks in the GMUG forest plan are a specific set of subwatersheds (12-digit hydrologic unit codes) where prioritization for long-term conservation and preservation of green-lineage of Colorado River cutthroat trout and western toad (previously named the “boreal toad”) occurs, specifically in areas where either non-native species are absent and/or where these two native species are self-sustaining. These subwatersheds were selected based on the conservation status, habitat quality and the likely continued persistence for the native green-lineage Colorado

River cutthroat trout, and to support ecological conditions for the population viability of the western toad (previously named the “boreal toad”). They are specifically in areas where either non-native species are absent or where these target native species are self-sustaining. Target species for the selected conservation watershed networks, and the hydrologic unit 12 codes (HUC 12), are listed in table 1.

### **Green Lineage Colorado River Cutthroat Trout**

In the absence of hybridization and competition with non-native fishes, habitat quality and connectivity are the most important factors for the persistence of native cutthroat trout. Consequently, during the selection of conservation watershed networks for cutthroat trout, subwatersheds were selected based on two criteria:

1. Conservation status designated by the Colorado River Cutthroat Trout Conservation Team (2006). Cutthroat trout populations that have greater than 90 percent genetic integrity are termed conservation populations.

AND

2. The inhabited stream length is at least 8 kilometers (about 5 miles, Hilderbrand and Kershner (2000)) OR the supporting watershed is at least 14.7 square kilometers (about 3,600 acres, Harig and Fausch (2002)).

### **Western Toad (Previously Named the “Boreal Toad”)**

Selection of western toad (previously named the “boreal toad”) conservation watershed networks is based on the criteria provided by the boreal toad recovery teams for population viability (Loeffler 2001). Note that for this purpose, “viability” is defined differently than the requirement by the 2012 Planning Rule to maintain ecological conditions necessary for a viable population of each Species of Conservation Concern. The 2012 Planning Rule requirement still applies to western toad. But in order for the population to be considered “viable” for purposes of selection for inclusion in the conservation watershed networks:

1. There must be documented breeding activity *and* recruitment to the population in at least four (4) out of the past ten (10) years.

OR

2. There has been an average observed total of at least, twenty (20) breeding adults at the breeding locality, producing an average of at least four (4) viable egg masses per year, with a stable number of breeding adults

AND

3. The population faces no known, significant, and imminent threat to its habitat, health, and environmental conditions.

Although there are many documented observations of western toad across the GMUG, given the prevalence of Chytridiomycosis, the amphibian fungal disease caused by *Batrachochytrium dendrobatidis*, the species has suffered severe declines in Colorado. Disease vectors are not well understood, and many once robust populations have become extirpated after the detection of *Batrachochytrium dendrobatidis*.

Of the documented observations of western toad across the GMUG, only three currently support successful breeding. Two of these populations (Texas Creek and Upper East River subwatersheds) are at high altitude sites within wilderness. It is thought that the remoteness of these sites has helped

to prevent the intrusion of the invasive chytrid fungus. Unfortunately, in the past two years Texas Creek has become positive for *Batrachochytrium dendrobatidis*. Currently it is unknown if the Texas Creek population has lost its viability due to *Batrachochytrium dendrobatidis*. Up to the present time the other site, located in the Maroon Bells-Snowmass Wilderness, remains free of *Batrachochytrium dendrobatidis*. Every effort should be made to not only protect and conserve the Upper East River population, but also keep it free of chytrid.

Similarly, the final subwatershed, Headwaters Buzzard Creek, is unique because even with the presence of chytrid, western toads are undergoing successful reproduction. Although the factors effecting this occurrence are not fully understood, it is possible that these toads have an innate resilience to chytrid. Management approaches and allowable activities within this subwatershed should maintain and protect the essential habitat supporting this unique population.

### **Wetland Restoration: In-Lieu Fee Program**

Sites in the GMUG National Forests for potential future use in the Army Corps of Engineers In-Lieu Fee Program are identified in table 51. Sites could be restored as compensatory, offsite mitigation for wetland impacts resulting from an authorized activity. *See supporting plan standard **FW-STND-RMGD-10.a**: For in-lieu fee sites identified in the forest plan, once restoration activities have begun, do not authorize management activities that would impact the functional ecological integrity of the site and its role in the In-Lieu Fee Program, consistent with 332.7(a)(4). See plan appendix 7 for list of identified sites.*

Additional sites may be identified during the life of the forest plan and may be incorporated to the plan by administrative change.

**Table 50. Western Slope In-Lieu Fee Program, U.S. Army Corps of Engineers: Potential projects in the GMUG at the time of the plan decision**

District	Service Area	Project Name	Estimated Wetland Benefitted (acres)	Project Description
Grand Valley	Uncompahgre Plateau	Star and McCullough	23	Star Lake and McCullough Reservoir are small water bodies with functioning fens in Delta County, Colorado, on the Grand Mesa of the Grand Valley Ranger District. These water bodies were previously part of a water bank system in which shares were available for purchase. To protect these waterbodies from being put into full water production, Western Colorado Land Trust purchased these shares for future wetland restoration. In an effort to gain ownership of these water bodies to restore and promote hydrologic function, the proposal is to relieve Western Colorado Land Trust of their financial obligation and purchase these water shares.
Gunnison	Gunnison-Taylor	Mt Emmons Fen	15	Restoration of the function and structure of the gossan include reducing sediment/metal transport by installing natural erosion control measures and revegetating adjacent steep upland slopes and restoring wetlands at the toe-of-slope which would further improve water quality by detaining runoff and reducing erosion potential, provide flood attenuation, and improve wildlife habitat.
Gunnison	Gunnison-Taylor	Flat-Top Riparian and Wet Meadow	10	Restoration of incised stream channels to restore groundwater and riparian/wetland vegetation. This is a multi-year project designed to benefit wetlands and critical habitat for Gunnison sage-grouse (Federally listed threatened).
Gunnison	Gunnison-Taylor	Hobbs Fen	13	Complete enclosure fence to prevent grazing damage to fen wetland complex.
Norwood	Dolores – San Miguel	Telluride Valley Floor Tailings	2	All mine tailings materials shall be removed from the Telluride Valley Floor Tailings Site, including removing eroding tailings that have been historically deposited along the banks of the San Miguel River and removal of tailings that have been deposited in the adjacent wetland area northwest of the intersection of Boomerang Road and the historical railroad grade.
Norwood	Dolores – San Miguel	Ophir Valley	5	Iron Spring and the surrounding fen is a unique and sensitive ecosystem that has experienced a recent increase in off-road vehicle damage. The project area consists of approximately 5 acres that requires immediate fencing and interpretive information to prevent future damage and some restoration work to remediate vehicle damage.



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## Appendix 8. Timber Suitability Analysis

### Identification of Lands as Not Suitable and Suitable for Timber Production

The following details the process used to comply with FSH 1909.12 chapter 60, *Forest Vegetation Resource Management*. During forest plan development and revision, identification of the suitability for lands for timber production is required by the National Forest Management Act of 1976 and by the 2012 Planning Rule. Lands identified as suitable for timber production may have a regularly scheduled timber harvest program that contributes to Forestwide desired conditions for supporting local economies, for climate adaptation and for other objectives, such as providing mosaics of habitats for wildlife species and managing fuels. *See the Timber section of the forest plan for explanation of how vegetation management in the GMUG is designed for purposes of forest health and climate adaptation with industry as a necessary partner.*

It is important to note that while timber cannot be harvested for the purpose of timber production on lands not suited for timber production (36 CFR 219.11(d)(1)), timber harvest may occur on lands “unsuitable for production” as a tool to assist in achieving or maintaining one or more applicable desired conditions or objectives of the plan “in order to protect other multiple-use values and for salvage, sanitation, public health, or safety” (36 CFR 219.11I). Examples of using timber harvest as a tool in the GMUG include, but are not limited to, ecological restoration including meadows or savanna ecosystems, climate change adaptation, improving wildlife or fish habitat, and fuels reduction for wildfire mitigation. (*See forest plan standard FW-STND-TMBR-03.*)

#### Step 1: Lands Not Suited for Timber Production Based on Legal / Technical Factors (61.1)

First, the analysis identifies lands that *may* be suited for timber production by removal of areas not suited using the criteria in the Land Management Planning Handbook FSH 1909.12 chapter 60. These areas and associated acreage were determined by starting with the total area of the Grand Mesa, Uncompahgre, and Gunnison National Forests and removing areas that are not suited for timber production per policy criteria, listed below:

- Inholdings
- (61.11) Lands not suited for timber production because timber production is prohibited, or the lands are withdrawn from timber production, include<sup>8</sup>:
  - Congressionally designated wilderness
  - Colorado roadless areas
  - Research natural areas (Escalante Creek and Gothic)
  - Other areas where timber production is prohibited (congressionally designated Roubideau, Tabeguache, and Fossil Ridge Recreation Management Areas)

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<sup>8</sup> Existing law, regulation, and policy prohibits timber production in these designated areas, with limited tree cutting exceptions specified in the respective establishing legislation, rules, and policies.

- (61.12) Lands on which the technology to harvest timber is not currently available without causing irreversible damage:
  - Areas labeled as active earthflow, active mudflow, or active landslide *and* with a slope  $\geq 30$  percent
- (61.13) Lands on which there is no reasonable assurance that lands can be adequately restocked within 5 years of final regeneration harvest:
  - Areas with abundant rock
- (61.14) Land that is not forested:
  - All roads with an operational maintenance level of 1-5. Road corridors were determined to approximate the area of the road, with the area suitable for timber production extending to the edge of the road. Road removals included:
    - Level 1 roads – 16-foot-wide corridor (removed in response to administrative review instructions; amounted to 230 acres)
    - Level 2 roads – 25-foot-wide corridor
    - Level 3 roads – 40-foot-wide corridor
    - Level 4 and 5 roads – 50-foot-wide corridor
    - State highways and interstates – 50-foot-wide corridor
    - All other roads – 25-foot-wide corridor
  - Powerlines, assuming a 150-foot-wide corridor for the largest lines (Western Area Power Administration and Tri-State) and a 50-foot-wide corridor for all others.
  - Administrative sites including ranger stations, townsites, and guard stations.
  - Non-forested areas. Areas removed had tree cover less than 10 percent and a habitat structural stage of natural meadow (1M) or natural shrubland (2S).
  - Nonindustrial species and cover types were removed, including pinyon, juniper, cottonwood, oak, water, barren, rock, riparian areas dominated by grass, forbs, or cottonwood, and all grassland and shrubland cover types. Note: Two nonindustrial ecosystem types were retained in this step – bristlecone-limber pine and subalpine-montane riparian woodlands. These acres were not used in the calculation of the sustained yield limit nor the projected timber sale program. This area amounts to approximately 16,600 acres.

The final area considered *may be suitable* for timber production is 873,770 acres of 2,967,000 acres of National Forest System lands managed by the GMUG National Forests. These lands are the starting point for step 2 of the suitability analysis.

Throughout the planning process, the public remained interested in the extent of the spruce beetle impact in the suitable timber process. Aerial survey data (1996-2018) indicate that spruce beetle has impacted approximately 343,000 acres in the national forest. This includes 113,000 acres in the area that *may be suitable* for timber production (13 percent).

## **Step 2. Lands Suited and Not Suited for Timber Production Based on Compatibility with Desired Conditions and Objectives**

*See plan appendix 1 for links to online maps.*

Note: The process used to determine the lands suitable for timber production follows the policy direction in FSH 1909.12, Chapter 60. This direction does not limit the lands suitable for timber production to areas that are currently economically feasible, in contrast to the 1982 planning rule.

**Boundary Corrections Applied:** Small area slivers result when two or more datasets don't have the exact same boundaries. Over the course of the years of plan revision process (2018-2024), spatial GIS data is updated to incorporate boundary corrections as they are noticed. As a result, additional small areas were removed to ensure that slivers of management areas intended to be removed and not allocated as suitable for timber production were fully removed. These removals amount to less than 1,000 acres and reflect boundary corrections for private lands and other non-NFS lands, Research Natural Areas, Congressionally designated wilderness and other areas Congressionally withdrawn from timber production (Fossil Ridge Special Recreation Area and Tabeguache and Roubideau Areas) and Colorado Roadless Areas.

**Additional Areas Removed:** Starting with the area that *may be suitable* for timber production from Step 1 (873,770 acres), and applying the boundary corrections, the following areas were then removed because timber production is not compatible with the desired conditions and objectives for these areas and/or 2) with consideration of public comments:

- Recommended wilderness (Management Area 1.2)
- Special interest areas (Management Area 2.1)
- Mountain resort areas (Management Area 4.1)
- Recreation emphasis areas (Management Area 4.2)
- Eligible wild and scenic rivers (using wild and scenic river mapped corridor overlay; **only** applied to those with the classification of "wild")
- Portions of designated critical Gunnison sage-grouse habitat – 1) all critical sage-grouse habitat that is *suitable* sage-grouse habitat within the critical habitat designation was removed, and 2) any critical sage-grouse habitat that is not *currently* suitable sage-grouse habitat but could become suitable sage-grouse habitat via restoration. Some portions of designated critical sage-grouse habitat, such as densely forested conifer, would not have potential to become suitable sage-grouse habitat via restoration, and these areas remained within the area suitable for timber production

**Additional Removals:** The planning team conducted a fine-grained analysis of timber suitability and additional acres were removed as the result of that analysis. Public comments indicated concern that the 2021 draft timber suitability analysis was too coarse and too inclusive, and citizen proposals for special areas argued that these areas were in fact not suitable for timber production. As a result, the planning team conducted a more fine-grained analysis of the area suitable for timber production between the 2021 draft and 2023 pre-objections final EIS. Areas were identified by district staff as unsuitable for a variety of reasons, including: wet conditions; wetlands/riparian areas not otherwise identified in the GIS data as non-forested; steep slope in combination with other factors such as poor site quality; rocky; adverse skid conditions; poor site quality; slivers of land/isolation; landlocked; access issues; additional non-forested areas not otherwise identified in the GIS data; avalanche-prone; or location in developed recreation sites.

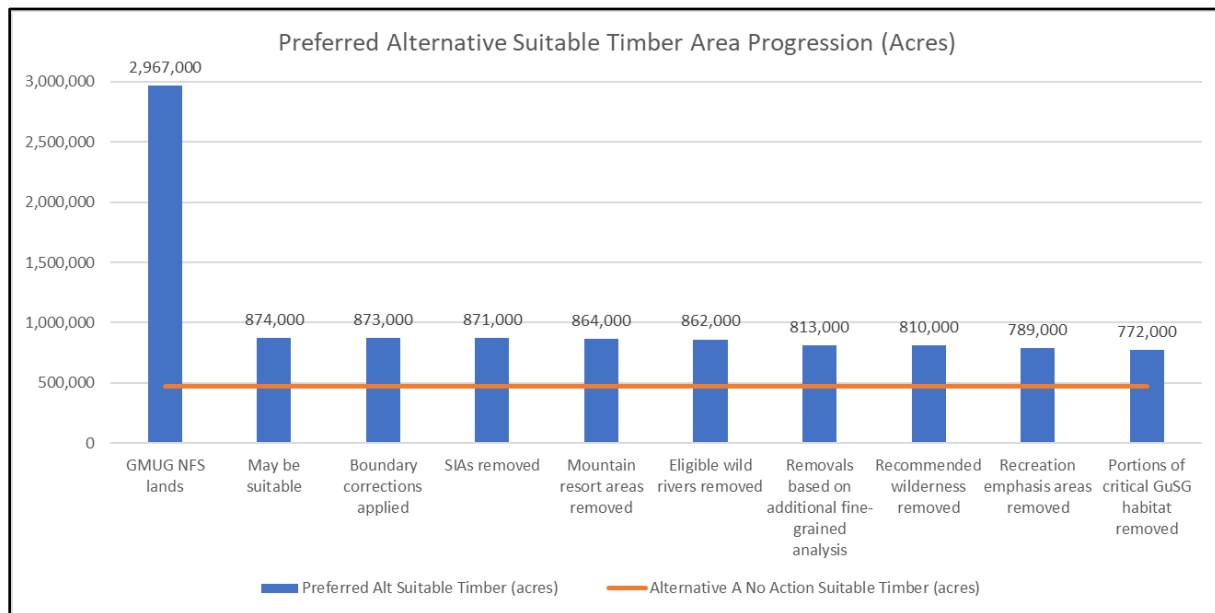
Staff paid particular attention to the following areas while conducting this fine-grained analysis, such that portions of the following were removed if found unsuitable for the factors identified above:

- Sensitive subwatersheds<sup>9</sup>
- Citizen proposals for special areas.

Approximately 49,000 acres were removed as a result of the fine-grained analysis.

Finally, in response to the administrative review instructions, steep slopes above Ironton and Mt. Emmons fens were removed that totaled approximately 1,100 acres.

The final area considered suitable for timber production in the final plan is 771,000 acres, rounded to the nearest 1,000. The cumulative change in the acreage of the areas suitable for timber production from the suitability analysis step 1 to step 2 from each of the removals is shown in Figure 6. Slight reductions to acreage (1,330 acres) were made as a result of the administrative review, as noted above and in the figure footnote.



**Figure 6. Change to the “may be suitable for timber production” area for the final plan for each criterion and removal applied<sup>10</sup>**

<sup>9</sup> Sub-watersheds considered as sensitive include Middle East River, Lower Quartz Creek, Upper Quartz Creek, and Gold Creek.

<sup>10</sup> The final area suitable for timber production is 771,000 acres. Although figure 6 totals 772,000 acres from the pre-objections final plan, as a result of administrative review instructions, 1) maintenance level 1 roads were also removed from the step 1/“may be suitable” for timber production (230 acres), such that step 1 resulted in approximately 873,770 acres, and 2) in step 2, steep slopes above Ironton and Mt. Emmons fens were removed that totaled 1,100 acres, such that the final area suitable for timber production is 771,000 acres, rounded to the nearest 1,000.

## Sustained Yield Limit Calculations

The sustained yield limit is the amount of timber that could be produced on all lands that *may be suitable* for timber production (*see step 1 in the section above*), assuming all of these lands were managed to produce timber without considering other multiple uses or fiscal or organizational capability (FSH 1909 chapter 64.31). The sustained yield limit was calculated, in part, using yield information from the GMUG’s earlier planning efforts. This yield information was based on output from the Forest Vegetation Simulator and is documented in an internal report – *Grand Mesa, Uncompahgre, and Gunnison National Forests, Summary of Yield Table Development for Forest Plan Revision* (Keyser 2005). Sustained yield limit was calculated with the following timber strata:

- Spruce-fir
- Spruce-fir-aspen
- Aspen
- Lodgepole pine
- Mixed conifer
- Ponderosa pine.

Additional areas that did not fit within these main strata were put into the “other” category and assigned no volume.

The management system, rotation age and/or entry interval, and associated harvest volume (cubic feet/acre) that were used to determine the sustained yield limit are listed in Table 52. Note, for spruce-fir, spruce-fir-aspen, and ponderosa pine, the entry interval assumed here is different than what was assumed for the projected timber program calculations (as seen in Vol 1, Chapter 2, Issue 2), which expanded the entry interval and associated harvest volume out to a full rotation for easier comparison across vegetation types. Also note that when expanded to the same rotation age, the SYL assumes higher volume yields (1.2 – 2.4 times higher, varying by vegetation type) than what is being assumed for the projected timber sale calculations given Forest Service staff specialists’ feedback.

**Table 51. Assumptions used for the timber sustained yield limit calculation**

[Values rounded to nearest 10.]

Strata	Timber Management System	Rotation Age and/or Entry Interval (years)	Acres of May be Suitable Lands <sup>1</sup>	Harvest Volume at Rotation Age/Entry Interval (board feet/acre) (from Keyser, 2005) <sup>2</sup>	Harvest Volume at Rotation Age/Entry Interval (cubic feet/acre)
Spruce-fir	Uneven-aged – Group Selection	30	192,800	1,380	280
Lodgepole pine	Even-aged – Clearcut	140	145,900	8,480	1,700
Aspen	Even-aged – Clearcut	120	214,800	17,130	3,430
Mixed conifer	Uneven-aged – Individual Tree Selection	160	28,200	-	1,100

Strata	Timber Management System	Rotation Age and/or Entry Interval (years)	Acres of May be Suitable Lands <sup>1</sup>	Harvest Volume at Rotation Age/Entry Interval (board feet/acre) (from Keyser, 2005) <sup>2</sup>	Harvest Volume at Rotation Age/Entry Interval (cubic feet/acre)
Ponderosa pine	Uneven-aged – Individual Tree Selection	40	84,100	1,760	350
Spruce-fir-aspen	Uneven-aged – Group Selection	30	191,300	1,690	340
Other (bristlecone-limber pine and subalpine-montane riparian woodlands)	(Not applicable)	(Not applicable)	16,600	(Not applicable)	(Not applicable)

<sup>1</sup> Values rounded to nearest 100.

<sup>2</sup> Values rounded to nearest 10.

Numerous adjustments were made in the initial Forest Vegetation Simulator yield table work (Keyser 2005) to determine the theoretically appropriate harvest volume. These adjustments included factoring in defect, using local merchantability specifications, adjusting the stand density maximum values, and capping tree size based on observed tree sizes.

Merchantable board foot volume specifications used in the Forest Vegetation Simulator yield table work assumed a minimum diameter of 7 inches and a minimum top diameter (inside bark) of 6 inches for lodgepole pine, a minimum diameter of 8 inches and a minimum top diameter of 6 inches for other conifers, and a minimum diameter of 5 inches and a minimum top diameter of 4 inches for aspen.

The estimated sustained yield limit is 12,762,000 cubic feet/year or 127,620 hundred cubic feet (CCF)/year. The administrative review resulted in approximately 230 fewer acres that “may be suitable for timber production” from removing Maintenance Level 1 roads (873,770 acres final area that “may be suitable”). The reduction amounted to .03%. This does not impact the projected timber sale program (see plan Appendix 2).

It is important to note that the sustained yield limit is based on the acres that *may be suitable* for timber production (873,770 acres), and it “is not limited by land management plan desired condition, other plan components, or the planning unit’s fiscal capability and organizational capacity” (1909.12, 60.5).

## Definitions

*Lands that may be suitable for timber production (FSH 1909.12 CH 60.5)* – A working classification in the process of determining lands that are suited for timber production. This working classification excludes National Forest System lands that are not suitable for timber production based on the factors identified in 36 CFR 219.11(a)(1)(i), (ii), (iv), (v), and (vi), and is made prior to the consideration of the factor at 36 CCFR 219.11(a)(iii), which identifies suitability based on objectives and desired conditions established by the plan for those lands.

*Lands suitable for timber production* – Area that defines where timber harvest for the purpose of timber production may occur, subject to subsequent project-level, site-specific data and analysis.

Timber harvest for purposes other than timber production may also occur here. Scheduled timber harvests occur on these lands, among other active management activities, to contribute to Forestwide desired conditions and multiple use goals.

*Sustained Yield Limit* – (FSH 1909.12 CH 60.5) – The amount of timber, meeting applicable utilization standards, “which can be removed from a forest annually in perpetuity on a sustained-yield basis.” It is the volume that could be produced in perpetuity on lands that *may be suitable* for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of the sustained yield limit is not limited by land management plan desired conditions, other plan components, or the planning unit’s fiscal capability or organizational capacity. The sustained yield limit is not a target but is a limitation on harvest, except when the plan allows for a departure.

*Timber harvest* (FSH 1909.12 CH 60.5) – The removal of trees for wood fiber use and other multiple-use purposes.

*Timber production* (FSH 1909.12 CH 60.5) – 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.

## References Cited

Keyser, C. 2005. Grand Mesa, Uncompahgre, and Gunnison National Forests, Summary of yield table development for forest plan revision. Internal report dated December 2005, available in the project record.



# Appendix 9. Regional Forester's List of Species of Conservation Concern

## Background

The 2012 Planning Rule and Forest Service Handbook 1909.12, chapter 20 require that the Regional Forester identify Species of Conservation Concern for the planning area.

Species identified by the Regional Forester as Species of Conservation Concern at the time of the plan decision, and the rationale for inclusion, are contained in volume II of the revised plan final environmental impact statement, appendix 3, table 59. Several additional tables include rationale for species considered but not included in the list at the time of the plan decision. A crosswalk of plan components for Species of Conservation Concern is contained in table 60 of that appendix.

The list of Species of Conservation Concern will be updated over the life of the forest plan per new best available scientific information.

An overview for each species that is native to, and known to occur in, the plan area and meets the consideration criteria at FSH 1909.12.12.52d has been prepared and is available on the GMUG plan website (USDA Forest Service 2018, and as updated in 2024 for the final list at the time of the plan decision). This information is considered supplemental background information. However, the final information used by the Regional Forester for the list at the time of the plan decision is documented in Volume 2, Appendix 3 of the final EIS. For each species, the overview includes:

1. Status
2. Taxonomy
3. Distribution, abundance, and trend in the planning area
4. A brief description of the natural history and key ecosystem functions
5. Overview of ecological conditions necessary for the recovery of federally listed threatened and endangered species, conservation of proposed and candidate species, and maintenance of viable populations of Species of Conservation Concern
6. Threats and other risk factors.

See the forest plan chapter 2, part II, Native Species Diversity section, subsection *At-Risk Species*, for plan direction specific to Species of Conservation Concern.

## Appendix 10. Coal Screening and Unsuitability Analysis

### Introduction

The Federal Government provides for coal leasing under the Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976. The Mineral Leasing Act outlines procedures for considering development of coal deposits through a leasing system that involves land use planning and environmental analysis. This appendix summarizes coal screening for Federal coal resources in the GMUG National Forest planning area.

The identification of areas unsuitable for coal leasing is a land use planning decision, providing direction for coal leasing decisions made by the Secretary of the Interior<sup>11</sup> and guiding the future development of federal coal resources in the planning area. Section 522I(2) of Surface Mining Control and Reclamation Act of 1977 (SMCRA) (30 U.S.C. 1272I(2)) prohibits surface coal mining operations on Federal lands within the boundaries of any national forest, with two exceptions. Both of these exceptions apply in the GMUG. As a result of SMCRA, surface coal mines are not permitted in the GMUG, so Screen 2 of this process (below) is only applied to potential surface impacts incidental to an underground coal mine.

National Forest System lands in the planning area were evaluated for coal leasing suitability using the screening process set forth in the *Competitive Leasing* section of 43 CFR 3420.1-4 and summarized as follows:

1. Identify lands that have coal development potential, using internal estimates and nonconfidential coal geology information and economic data provided by public and private sources,
2. Evaluate lands identified as having coal development potential in relation to the unsuitability criteria set forth in 43 CFR 3461 to determine areas that are unsuitable for all or stipulated methods of surface mining,
3. Identify multiple land use decisions that could eliminate from leasing lands that contain resource values and land uses that are locally, regionally, or nationally important or unique and that are not included in the unsuitability criteria.

The Department of the Interior offers Federal coal resources through two application processes: lease-by-application and application to modify an existing lease. Applications are typically initiated by coal companies, qualified individuals, or existing coal lessees. When a federal coal tract is proposed for leasing, the Forest Service and Bureau of Land Management review the application to ensure that it conforms to existing land use plans, and the Bureau of Land Management assures it contains sufficient geologic data to assess the fair market value of the coal. Both leasing processes require compliance with the National Environmental Policy Act, in which impacts associated with a proposed action are evaluated. The role of the Forest Service in that process is to consent (or not) to Bureau of Land Management leasing National Forest System lands with stipulations for protection of

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<sup>11</sup> The Secretary of Interior makes coal leasing decisions (not the Secretary of Agriculture), although the Forest Service makes a recommendation to the Secretary of Interior regarding whether there are significant recreational, timber, economic, or other values that may be incompatible with such surface mining operations incident to an underground coal mine. 30 U.S.C. 1272(e)(2).

surface resources (FSM 2822.04c, R2 Supplement; 43 CFR 3400.3-1). The Bureau of Land Management would make a subsequent decision on leasing.

## **Results of the Coal Screening Process**

The following details the results of screening procedures used to identify lands in the planning area as unsuitable for future coal leasing consideration. In any future project-level decision, applicable screening criteria would also be applied to determine if additional lands, given site- and project-level specifics, would also be unsuitable.

### **Screen 1: Identification of Potential Coal Resource Area and Development Potential**

The Forest Service relies on information from the Bureau of Land Management for estimating Somerset, Grand Mesa, and Nucla-Naturita coal fields constituting the leased and unleased Federal coal resources within the planning area where development, theoretically, could occur over the life of the forest plan. Portions of these three coal fields are included in the potential coal resource area used in Screen 2 of this analysis. Coal fields near Crested Butte, Colorado, are not currently addressed by the Bureau of Land Management Gunnison Field Office, are likely considered depleted from historic coal mining, and are not brought forward here for further discussion.

Regarding development potential, the Somerset Coal Field contains one active mine on federal leases operating in coal seams of the Mesaverde Formation and has the highest development potential of the three areas in the GMUG National Forests. This is the only area in the GMUG where coal is likely to be mined during the life of the forest plan because 1) there is an existing coal mine, West Elk Mine; 2) there is an existing rail line to transport coal from the West Elk Mine; 3) there are existing coal leases; and 4) coal production nationwide has declined over the past decade (USEIA 2021); and 5) it is unlikely new coal mines will be permitted during the plan horizon because of domestic energy and climate change policies. Adjacent to Somerset Coal Field, the Grand Mesa Coal Field also consists of Mesaverde coals. There is no active mining of federal mineral estate within the Grand Mesa Coal Field. The Somerset and Grand Mesa are considered deep coal fields, with overburden depths currently considered too great to allow for surface mining potential. Nucla-Naturita Coal Field has overburden depths sufficiently shallow to allow for surface mining of Dakota Formation coals, although this is not permitted in the GMUG National Forests. The New Horizon Coal Mine, on private surface and private minerals, near Nucla, Colorado, had ceased production after March 2017 and entered final reclamation.

The unleased portion of potential coal resource area was then limited to 1) no more than 3,000 feet of overburden based on known, current technological difficulties in recovering coal deeper than this and 2) identified as high potential based on geologic resource, consistent with the Bureau of Land Management Grand Junction and Uncompahgre Field Offices' analyses in their current resource management plans. The potential coal resource area is indicated in figure 7. Prior to the Thompson Divide Administrative Withdrawal discussed below, the potential coal resource area had been identified as approximately 59,300 acres in the planning area. This potential coal resource area is the starting point for Screen 2, the unsuitability criteria review, described in the following section. This potential coal resource area is for analysis purposes based on known conditions and is not to imply that technological advances may not occur during the plan horizon that would render either deeper areas or areas with lower mineral potential mineable. If future lease applications or modifications were to be submitted for areas outside the current potential coal resource area, they would be reviewed in the context of all criterion and forest plan direction. Because the unsuitability criterion in Screens 2 and 3 are applied to management areas and other mapped allocations in the forest plan or

applied per regulations, a forest plan amendment would be unlikely to be needed if future lease proposals were to be submitted for areas outside the currently identified potential coal resource area.

On April 3, 2024, the Thompson Divide 20-year Administrative Withdrawal removed approximately 9,340 acres of potential coal resource area from coal leasing on the GMUG National Forest, resulting in a total remaining 50,000 acres of potential coal resource area. This is reflected in Figure 7. See also Federal Register Vol. 87, No. 199, Monday, October 17, 2022, Notices (pp. 62878-62885). Unsuitability criteria review below has been updated accordingly. Some areas previously found to be either 1) unsuitable per the forest plan 2023 draft Record of Decision or 2) subject to surface use restrictions per the 2023 forest plan draft Record of Decision overlapped this subsequent administrative withdrawal area. As a result, summary tables below reflect both reduced 1) unsuitable area and 2) area subject to surface use restrictions, as some of that area is no longer considered potential coal resource area per the administrative withdrawal.

## Screen 2: Unsuitability Criteria Review

As required by 43 CFR 3461, the Forest Service assessed the potential coal resource areas (identified in Screen 1) in relation to twenty unsuitability criteria to determine “unsuitability for surface mining and/or underground mining” as Screen 2. Note that surface coal mining operations means 1) activities conducted on the surface of lands in connection with a surface coal mine or 2) surface operations and surface impacts incident to an underground mine, as defined in section 701(28) of the Surface Mining Control and Reclamation Act (30 U.S.C. 1291(28) and 43 CFR 3400.0-5. As noted in Screen 1, surface coal mines are unsuitable in the GMUG. In accordance with 43 CFR 3461.3-2, lands already leased for coal mining were not assessed. Existing leases are shown in Figure 7.

The unsuitability criteria were not applied to the other coal fields in the planning area that have deep coal deposits (>3,000 feet overburden) and no clearly defined areas where surface operations could occur. *See also assumptions in Screen 1.* Certain criteria would be applied to surface facilities and operations during the leasing stage, as allowed by 43 CFR 3461.2-1(b) (1) and 3461.3-1. Unsuitability Criteria are analyzed as follows. A summary of the findings is detailed in the end of this appendix.

Note the following regulation provides exemptions from the criteria for underground mining and have been applied accordingly throughout this analysis: “43 CFR 3461.1 (a) Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in section 3400.0-5 of this title, on any lease, if issued. (b) Where underground mining will include surface operations and surface impacts on Federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency finds that a relevant exception or exemption applies.”

### Criterion Number 1

**Criterion:** “All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): The following are not applicable:

- National Park System
- National Wildlife Refuge System

- National Wilderness Preservation System. Note that all designated wilderness in the planning area has been excluded from coal potential resource and will not be considered.
- National Recreation Areas
- Federal lands in incorporated cities, towns, and villages

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (a)(2)(i), “A lease may be issued within the boundaries of any National Forest if the Secretary finds no significant recreational, timber, economic or other values which may be incompatible with the lease; and (A) surface operations and impacts are incident to an underground coal mine, or (B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those National Forests west of the 100th Meridian, that surface mining may be in compliance with the Multiple-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977<sup>12</sup>” and 3461.5 (a)(3) “The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977.”

**Analysis:**

While national trail segments do occur in the GMUG, they do not overlap potential coal resource area and are, therefore, not applicable.

For the final plan, the rivers found eligible for the National Wild and Scenic River system in the potential coal resource area are found to be unsuitable. The final plan provides administrative protection to rivers found eligible or determined suitable for the National Wild and Scenic River system to protect the values that provide the basis for their suitability for inclusion in the system (36 CFR 219.10(b)(1)(v)) and is the preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, or the President of the United States during the designation process. See section 2(b) of the Wild and Scenic Rivers Act (16 U.S.C. 1273). One eligible wild and scenic river corridor, Anthracite Creek, partially overlapped the potential coal resource area in the planning area, prior to the Thompson Divide Administrative Withdrawal. One hundred forty-four (144) acres of the full 1,150-acre eligible corridor is unsuitable for surface operations incident to an underground coal mine and unsuitable for underground mining. *However, per the Thompson Divide Administrative Withdrawal, this entire area has now been withdrawn from leasing for 20 years as of April 8, 2024.*

There are known acquired lands in the vicinity of existing coal leases. Land status of any acquired lands will be reviewed prior to coal leasing within the potential coal resource area and to determine if Land and Water Conservation Fund (LWCF) funds were used in the acquisition. If LWCF funds were used, leasing must be consistent with the purposes of the acquisition.

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<sup>12</sup> In the Surface Mining Control and Reclamation Act, significant forest cover means an existing plant community consisting predominantly of trees and other woody vegetation. The Secretary of Agriculture shall decide on a case-by-case basis whether the forest cover is significant within those national forests west of the 100th meridian) at the time site-specific leases are evaluated.

The underground mining exemption (43 CFR §3461.1) and criterion exceptions 43 CFR 3461.5 (a)(2)(i) and 3461.5 (a)(3) would apply, pending further analyses, for underground mining and the surface effects incident to underground mining on other National Forest System lands. An additional approximately 2,061 acres of the potential coal resource area without a prior applicable unsuitability criterion have been withdrawn from coal leasing per the Thompson Divide 20-year Administrative Withdrawal Record of Decision.

## **Criterion Number 2**

**Criterion:** “National Forest System lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, on federally owned surface shall be considered unsuitable.”

**Criterion Not Applicable:** The following resources or resource conditions related to this criterion do not exist within the assessed coal lands: surface leases for residential, commercial, industrial, or other public purposes.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (b)(2), “A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that: (i) All or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or (ii) The right-of-way or easement was granted for mining purposes; or (iii) The right-of-way or easement was issued for a purpose for which it is not being used; or (iv) The parties involved in the right-of-way or easement agree, in writing, to leasing; or (v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations” and 3461.5(b)(3) “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan, the following easements/corridors within in the potential coal resource area are found to be unsuitable: the West-wide energy corridor and Western Area Power Administration powerline corridors overlap approximately 600 acres of the potential coal resource area. These areas/easements are unsuitable for surface operations incident to an underground coal mine because of the occupied surface/setbacks and unsuitable for underground mining due to subsidence potential affecting existing powerline tower structures.

No additional lands within the potential coal resource area are found to be unsuitable per this criterion.

Numerous additional rights-of-way occur within the potential coal resource area in the planning area. Prior to coal leasing, the Forest Service will examine proposed National Forest System lands and identify additional rights-of-way and easements listed under Criterion 2 as unsuitable for surface operations. The underground mining exemption (43 CFR 3461.1) and criterion exceptions 3461.5 (b)(2) and 3461.5(b)(3) would apply.

## **Criterion Number 3**

The terms used in this criterion are defined in the Office of Surface Mining Reclamation and Enforcement regulations at Chapter VII of 30 CFR.

**Criterion:** “National Forest System lands affected by section 522I (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.”

**Criterion Not Applicable** The following resource conditions do not exist within the assessed coal lands: within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling resources. The criterion is therefore not applicable for these resources.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (c)(2) “A lease may be issued for lands: (i) Used as mine access roads or haulage roads that join the right-of-way for a public road; (ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated; (iii) If, after public notice and opportunity for public hearing in the locality, a written finding is made by the authorized officer that the interests of the public and the landowners affected by mining within 100 feet of a public road will be protected. (iv) For which owners of occupied dwellings have given written permission to mine within 300 feet of their buildings” and (c)(3) “The application of this criterion is subject to valid existing rights and does not apply to surface coal mining operations existing on August 3, 1977.”

**Analysis:** The following public road within the potential coal resource area is found to be unsuitable: County Road 12 (Kebler Pass). This is also a scenic byway. This area – approximately 1,260 acres - is unsuitable for surface operations incident to an underground coal mine that affect the scenic byway’s designation and unsuitable for underground mining due to the potential for subsidence to affect these surface features. *Note: Per the per the Thompson Divide Administrative Withdrawal, approximately 659 acres of this area has also been withdrawn from leasing for 20 years as of April 8, 2024. The remaining 602 acres would remain unsuitable per the forest plan decision.*

No additional lands within in the potential coal resource area are found to be unsuitable per Criterion 3. Prior to coal leasing within any potential coal resource area, the Forest Service will examine National Forest System lands and identify areas and structures listed per Criterion 3 as unsuitable for surface mining and surface operations. The underground mining exemption (43 CFR 3461.1) and criterion exceptions 3461.5 (c)(2) and 3461.5(c)(3) would apply.

#### **Criterion Number 4**

**Criterion:** “National Forest System lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land that is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): There are no wilderness study areas in the GMUG. However, the final plan’s recommended wilderness is applicable.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b) for valid existing rights.

**Generally Suitable for Underground Mining pending Application of Exceptions on Site-Specific Basis:** See 43 CFR 3461.5(d), “The application of this criterion to lands for which the Bureau of Land Management is the surface management agency and lands in designated wilderness areas in National Forests is subject to valid existing rights.”

**Analysis:** No wilderness study areas have been designated within the planning area. For the final plan, lands allocated as recommended wilderness are unsuitable for coal mining and only the criterion exemption would apply. A small amount of the final plan’s recommended wilderness allocation (Management Area 1.2) overlaps the potential coal resource area, amounting to approximately 20 acres. There are no existing coal leases in this area. Recommended wilderness areas must maintain the wilderness characteristics for which it has been deemed suitable. See also 16 U.S.C. 1600, 36 CFR 219.7(c)(2), FSH 1909.12 Chapter 70, and FSM 2320. This area is administratively unsuitable for surface operations incidental to an underground coal mine and unsuitable for underground mining in order to maintain wilderness characteristics pending completion of any future congressional designation process.

*Note, as of April 8, 2024, the Thompson Divide Administrative Withdrawal has now withdrawn all of the revised plan’s recommended wilderness from leasing.*

## **Criterion Number 5**

**Criterion:** “Scenic National Forest System lands designated by visual resource management analysis as class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (e)(2) “A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area” and 3461.5(e)(3), “This criterion does not apply to lands: to which the operator has made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977, or which include operations on which a permit has been issued.”

**Analysis:** In the Forest Service Scenery Management System used for the forest plan, scenic integrity objectives categorized as Very High and High generally correspond to Bureau of Land Management class I areas. The potential coal resource area overlaps 40,707 acres of areas allocated in the forest plan for High and Very High scenic integrity objectives, not including overlaps with areas already found unsuitable for leasing per other criterion (e.g., scenic byways, wild and scenic river corridors). As the Thompson Divide 20-year Administrative Withdrawal has now withdrawn approximately 6,535 acres pertinent to this criterion, the remaining 34,180 acres to be managed for High and Very High scenic integrity objectives were analyzed here and found to be “subject to surface restrictions”. During coal leasing analysis, the Forest Service will examine proposed Federal lands and identify High and Very High scenic integrity objective areas as unsuitable for surface operations, unless stipulations or conditions of approval can be imposed to minimize this effect



consistent with other management direction (per applicable exceptions and exemptions see 43 CFR 3461.5(e)(2) and (e)(3)). These areas are included in Figure 7 as “subject to surface restrictions”.

### ***Criterion Number 6***

**Criterion:** “National Forest System lands under permit by the Forest Service, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): Currently does not apply.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions Site-Specific Basis:** For applicable exemption see 43 CFR 3461.5(f)(2), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** No scientific studies listed in Criterion 6 are currently being conducted within the potential coal resource area. For the final plan, no lands within the potential coal resource are found to be unsuitable. Prior to coal leasing, the Forest Service will examine proposed Federal lands and identify areas with scientific studies, demonstrations, and experiments listed in Criterion 6, and meeting the thresholds in Criterion 6, as unsuitable for surface mining and surface operations for the duration of the study.

### ***Criterion Number 7***

**Criterion:** “All publicly or privately owned places that are included in the National Register of Historic Places shall be considered unsuitable. This shall include any areas that the Forest Service determines, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, are necessary to protect the inherent values of the property that made it eligible for listing in the National Register.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (g)(2) “All or certain stipulated methods of coal mining may be allowed if, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, they are approved by the surface management agency, and, where appropriate, the State or local agency with jurisdiction over the historic site” and 3461.5(g)(3) “This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will examine proposed Federal lands, consult with the Advisory Council on Historic Preservation and the State Historic Preservation Office, and identify National Register of Historic Place sites as unsuitable for surface operations.

### **Criterion Number 8**

**Criterion:** “National Forest System lands designated as natural areas or as national natural landmarks shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): Currently does not apply.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (h)(2), “A lease may be issued and mining operation approved in an area or site if the surface management agency determines that: (i) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or (ii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites)” and 3461.5(h)(3), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which includes operations on which a permit has been issued.”

**Analysis:** No natural areas or national natural landmarks have been identified within the potential coal resource area in the planning area. For the final plan, no lands were found to be unsuitable. Prior to coal leasing within any potential coal resource area in the planning area, any potential future federal lands designated as natural areas or National Natural Landmark sites (containing outstanding biological and geological resources), regardless of land ownership, shall be considered unsuitable for surface operations.

### **Criterion Number 9**

**Criterion:** “Federally designated critical habitat for listed threatened or endangered plant and animal species, and habitat proposed to be designated as critical for listed threatened or endangered plant and animal species or species proposed for listing, and habitat for Federal threatened or endangered species, which is determined by the U.S. Fish and Wildlife Service and the Forest Service to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Generally, yes per exemptions 43 CFR 3461.1 (a) or (b) but may depend upon species.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (i)(2), “A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat” and 3461.5(i)(3), “This criterion

does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan decision, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, federal lands with designated and proposed critical habitat shall be identified and considered as to whether they are unsuitable for surface operations per Criterion 9 and applicable exceptions and exemptions.

### ***Criterion Number 10***

**Criterion:** “National Forest System lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): Unknown.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (j)(2), “A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining” and 3461.5(j)(3), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

**Analysis:** No critical or essential habitat for State-listed threatened or endangered plant and animal species has been identified within potential coal resource area in the planning area to-date. For the final plan decision, no lands were found to be unsuitable. Prior to coal leasing, the Forest Service will re-examine status and survey for State-listed species that may be impacted by proposed surface coal operations and facilities in relation to Criterion 10.

### ***Criterion Number 11***

**Criterion:** “A bald or golden eagle nest or site on National Forest System lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the U.S. Fish and Wildlife Service.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (k)(2), “A lease may be issued if: (i) It can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or (ii) The surface management agency, with the concurrence of the Fish and Wildlife Service, determines that the

golden eagle nest(s) will be moved. (iii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected” and 3461.5(k)(3), “This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan decision, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will evaluate proposed surface operations and facilities per Criterion 11: National Forest System lands within an appropriate buffer zone of known active bald or golden eagle nesting sites (established through consultation with the U.S. Fish and Wildlife Service and/or the State of Colorado) will be considered as to whether they are unsuitable for surface operations.

### **Criterion Number 12**

**Criterion:** “Bald and golden eagle roost and concentration areas on National Forest System lands used during migration and wintering shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (l)(2), “A lease may be issued if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed” and 3461.5(l)(3), “this criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will examine and survey surface operations and facilities per Criterion 12. National Forest System lands within a buffer identified in coordination with the State of Colorado of known bald or golden eagle roosts and concentration areas will be identified as unsuitable for surface operations.

### **Criterion Number 13**

**Criterion:** “National Forest System lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of National Forest System lands around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the U.S. Fish and Wildlife Service.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, per exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5

(m)(2), “A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the falcon habitat during the periods when such habitat is used by the falcons” and 3461.5(m)(3), “This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan decision, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will evaluate proposed surface operations and facilities per Criterion 13.

### ***Criterion Number 14***

**Criterion:** “National Forest System lands that are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the Forest Service and the U.S. Fish and Wildlife Service, shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (n)(2), “A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species” and 3461.5(n)(3), “This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan decision, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service— in consultation with the U.S. Fish and Wildlife Service— will consider high-priority migratory bird habitat and evaluate proposed surface mining and surface operations per Criterion 14.

### ***Criterion Number 15***

**Criterion:** “Lands that the Forest Service and State jointly agree are habitat for resident species of fish, wildlife, and plants of high interest to the State and that are essential for maintaining these priority wildlife and plant species shall be considered unsuitable. Examples of such lands that serve a critical function for the species involved include:

1. Active dancing and strutting grounds for sage-grouse, sharp-tailed grouse, and prairie chicken,
2. Winter ranges crucial for deer, antelope, and elk,
3. Migration corridors for elk, and
4. Extremes of range for plant species.

A lease may be issued if, after consultation with the State, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b) depending upon consultation with the State of Colorado regarding species.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exemptions see 43 CFR 3461.5 (o)(2), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** For the final plan decision, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will evaluate proposed surface operations in relation to Criterion 15.

### ***Criterion Number 16***

**Criterion:** “Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval) on which the Forest Service determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b) with the application of stipulations.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exemptions see 43 CFR 3461.5 (p)(2), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** Coastal flood plains do not occur within the planning area. Other floodplains exist within the planning area. For the final plan, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will evaluate proposed surface mining and surface operations in relation to Criterion 16.

### ***Criterion Number 17***

**Criterion:** “National Forest System lands that have been committed by the Forest Service to use as municipal watersheds shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b).

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (q)(2), “A lease may be issued where the surface management agency in consultation with the municipality (incorporated entity) or the responsible governmental unit determines, as a result of

studies, that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree” and 3461.5(q)(3), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** Grand Mesa and Somerset coal fields both contain numerous municipal watersheds within which surface operations may be considered unsuitable. Because designation of municipal watersheds is likely to continue over time, the Forest Service will evaluate proposed surface operations in relation to Criterion 17 at the time of leasing. Note: the identification of municipal watersheds is not a forest plan decision. For the final plan, no lands within the potential coal resource area were found to be unsuitable.

### ***Criterion Number 18***

**Criterion:** “National Forest System lands with National Resource Waters, as identified by State of Colorado in their water quality management plans, and a buffer zone of National Forest System lands one-quarter mile from the outer edge of the far banks of the water, shall be unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): Currently not applicable.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, to exemptions 43 CFR 3461.1 (a) or (b) with the application of buffers described in criterion.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions and exemptions see 43 CFR 3461.5 (r)(2), “The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters” and (r)(3), “This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.”

**Analysis:** No national resource waters have been identified by the State of Colorado within the potential coal resource area in the planning area. For the final plan, no lands within the potential coal resource area were found to be unsuitable. Prior to coal leasing, the Forest Service will evaluate proposed surface operations in relation to Criterion 18.

### ***Criterion Number 19***

**Criterion:** “Criterion Number 19. Federal lands identified by the surface management agency, in consultation with the State in which they are located, as alluvial valley floors according to the definition in section 3400.0-5(a) of this title, the standards in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published, and approved State programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): No, criterion applies.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Yes, with the application of stipulations and conditions of approval.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exemptions see 43 CFR 3461.5 (s)(2), “This criterion does not apply to surface coal mining operations which produced coal in commercial quantities in the year preceding August 3, 1977, or which had obtained a permit to conduct surface coal mining operations.”

**Analysis:** Alluvial valley floors will be identified at the time of coal leasing. Office of Surface Mining Reclamation and Enforcement guidelines will be followed. Surface coal mining operations may occur along alluvial valley floors if no reasonable alternative sites exist outside these areas in compliance with plan direction. Lease stipulations and conditions of approval would be required to minimize disturbance and impacts to water supplies within these areas. For the final plan, no lands within the potential coal resource area were found to be unsuitable.

### **Criterion Number 20**

**Criterion:** “National Forest System lands in a state to which is applicable a criterion (i) proposed by the State of Colorado or Indian Tribe located in the planning area, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.”

**Criterion Not Applicable** (The resources or resource conditions related to this criterion do not exist within the assessed coal lands): Currently not applicable.

**Criterion Applicable but Exempted (Underground Mining Exemption, 43 CFR 3461.1):** Currently not applicable.

**Generally Suitable for Underground Mining pending Application of Exemptions and Exceptions on Site-Specific Basis:** For applicable exceptions see 43 CFR 3461.5(t)(2), “A lease may be issued when: (i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft comprehensive land use plan or land use analysis, plan, or supplement to a comprehensive land use plan, for the area in which such land is included, or (ii) After consultation with the state or affected Indian tribe, the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the value which the criterion would protect.”

**Analysis:** No National Forest System lands within potential coal resource areas in the planning area have been proposed by the State of Colorado or an Indian Tribe as unsuitable. For the final plan, no lands were found to be unsuitable. Prior to coal exploration or leasing within the potential coal resource area in the planning area, the Forest Service will review proposed surface operations in relation to Criterion 20.

### **Screen 3: Identification of Multiple Land Use Directions**

Screen 3 requires evaluating multiple land use decisions or direction, codified at 43 CFR 3420.1-4, that could or have eliminated from surface or underground coal leasing consideration, Federal lands containing resource values and uses that are considered locally, regionally, or nationally unique or more important than coal. Such values and uses include, but are not limited to, those identified in Section 522(a)(3) of the Surface Mining Reclamation and Control Act of 1977 and the Criteria for Designating Areas as Unsuitable for Surface Coal Mining Operations (30 CFR 762.11).



## Colorado Roadless Areas

Colorado roadless areas are managed in accordance with the Colorado Roadless Rule (36 CFR 294). Colorado roadless areas overlap the potential coal resource area. While the North Fork Coal Mining Area portion of the rule was remanded in 2020 regarding the original 2012 Colorado Roadless Rule exception for roadbuilding in this area, leasing is still available in that area, but road construction and reconstruction would be precluded. At the time of the plan decision, there is no Schedule of Proposed Actions entry or other indications that the agency is planning to reinstate the North Fork Coal Mining Area exception. Because of the geologic nature of the coal resource, surface use to vent the underground workings may be needed unless technology or conditions change, which may necessitate roads that are now prohibited per the Court decision. Without this exception to the Rule, mining, and therefore leasing, may not be practical unless venting of methane can be accomplished without roads. Mineability would be determined in future coal leasing analyses subject to the surface restrictions of the Colorado Roadless Rule. These areas (totaling approximately 34,180 acres) are indicated in Figure 7 as “subject to surface restrictions”. *Note: Approximately 5,134 acres of Colorado roadless areas are also withdrawn from leasing in the potential coal resource area per the Thompson Divide 20-year Administrative Withdrawal as of April 8, 2024.*

## Other Actions

On April 8, 2024, the Thompson Divide 20-year Administrative Withdrawal removed approximately 9,340 acres of potential coal resource area from coal leasing on the GMUG National Forests. This is reflected in Figure 7. See also Federal Register Vol. 89, No. 68, Monday, April 8, 2024, Notices (pp. 24486-24493). Portions of the administratively withdrawn area overlap areas that would have otherwise been unsuitable for coal leasing in this forest plan decision per criterion screening above (approximately 740 acres). Should the administrative withdrawal expire, the unsuitability criterion screens would be again applied to any subsequent future leasing action, and at such time the agency would apply all relevant forest plan allocations, plan direction, and consideration of other site-specific factors to determine if any lands were unsuitable. Portions of the administratively withdrawn area also overlap areas that would have been subject to surface use restrictions per forest plan allocations (approximately 6,540 acres). Should the administrative withdrawal expire, surface use restrictions would be applied to meet the requirements of the unsuitability criterion.

Future legislative actions such as the CORE Act, which includes the area within the Thompson Divide Administrative Withdrawal, may permanently remove acres available for leasing. However, potential legislative actions are not included in the tables below, as they are not part of the existing legal framework at the time of the plan decision and are beyond the scope of the forest plan.

## Summary

Areas that are determined unsuitable for coal leasing per the unsuitability criteria analysis in Screens 2 and 3 are summarized in Table 53. A determination of “unsuitable for coal leasing” means an area is unsuitable for *both* 1) underground mining and 2) future surface operations incidental to an underground coal mine.

Areas that would be subject to surface use restrictions per forest plan allocations are summarized in Table 54.

Total areas withdrawn per the Thompson Divide 20-Year Administrative Withdrawal, areas unsuitable per the forest plan, and areas subject to surface use restrictions per the forest plan are summarized in Table 55.

**Table 52. Areas that are “unsuitable” for coal leasing on the GMUG**

[rounded to nearest 10 acres.]

<b>Land Allocation Overlapping the Potential Coal Resource Area</b>	<b>Acres Considered Unsuitable for Leasing (Note that areas in one category often overlap areas in another category)</b>
Rights-of-ways and/or easements	600
Public roads/scenic byways	600
<b>Absolute Total (Does not include overlaps)</b>	<b>1,200 (2.4% of potential coal resource area)</b>

**Table 53. Areas subject to surface use restrictions for surface operations incidental to underground coal mining on the GMUG**

[rounded to nearest 10 acres.]

<b>Land Allocation</b>	<b>Additional Acres Subject to Surface Use Restrictions (and percentage of potential coal resource area) Note all Colorado Roadless areas overlap mapped high/very high scenic integrity objectives</b>
High or very high scenic integrity objectives	34,180 (68%) (overlaps all of the Colorado Roadless Areas in following row)
Colorado Roadless Areas	34,180 (68%)
<b>Absolute Total</b>	<b>34,180 (68%)</b>

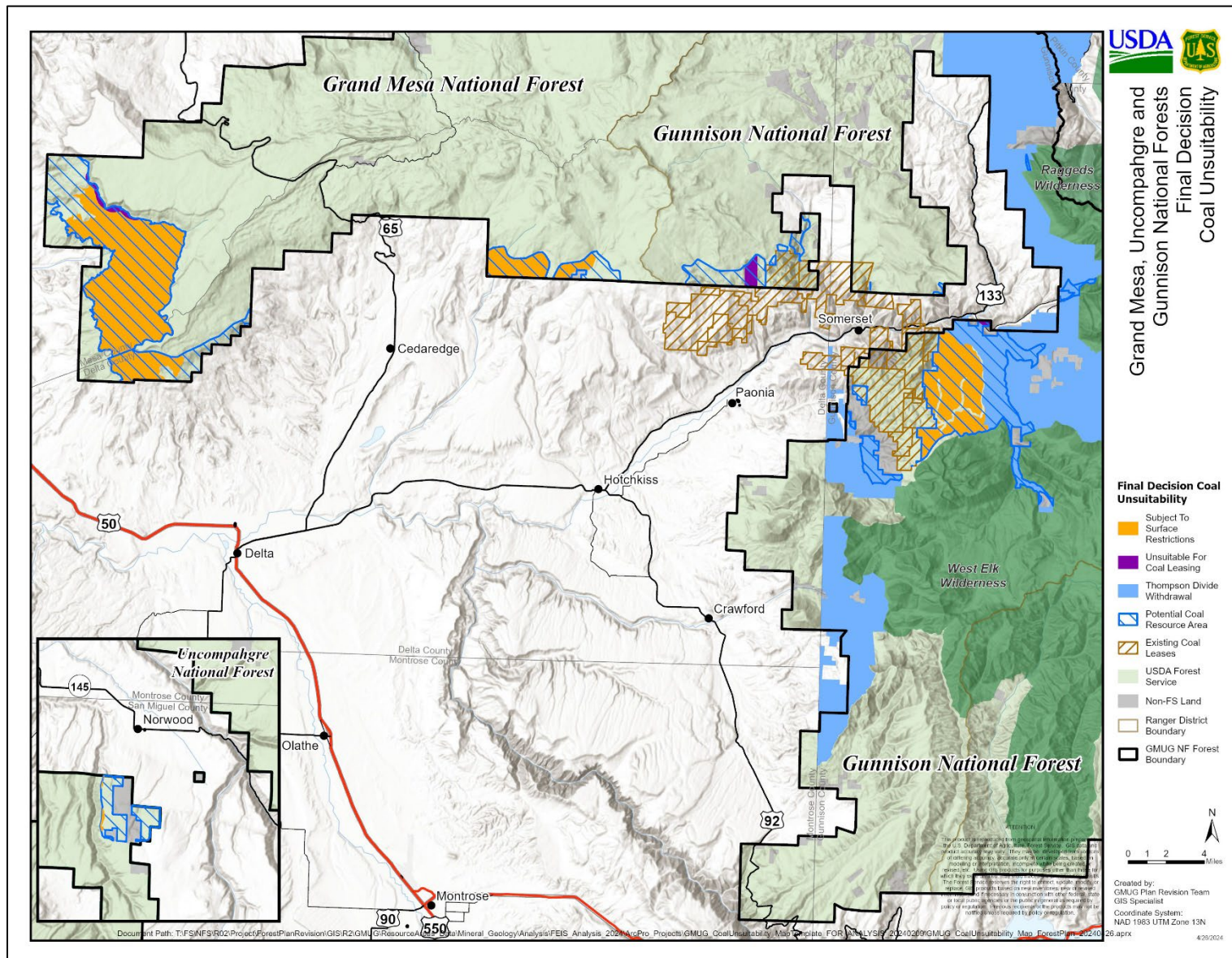
**Table 54. Summary of acreage administratively withdrawn, unsuitable, or subject to surface use restrictions for coal leasing on the GMUG**

[rounded to nearest 10 acres.]

<b>Acres of Potential Coal Resource Area withdrawn per the Thompson Divide 20-year Administrative Withdrawal</b>	<b>Unsuitable acres (and percentage of potential coal resource area), per revised forest plan</b>	<b>Acres subject to surface restrictions requiring project-level review (and percentage of potential coal resource area)</b>
9,340	1,200 (2.4%)	34,180 (68%)

## Reference Cited

U.S. Energy Information Administration (USEIA). 2021. Annual coal report 2021. Accessed April 28, 2023, at: <https://www.eia.gov/coal/annual/pdf/acr.pdf>



**Figure 7. Areas determined unsuitable for coal leasing and areas subject to surface use restrictions per the revised GMUG forest plan.**

Note: The Thompson Divide 20-Year Administrative Withdrawal is not part of, nor affected by, the revised forest plan decision. It is an administrative withdrawal beyond the scope of the forest plan decision.

# **Appendix 11. Final Wild and Scenic River Eligibility Evaluation for the GMUG**

## **Introduction**

### **What is the Purpose of the Wild and Scenic River Process?**

The National Wild and Scenic Rivers System was established by Congress in 1968 to preserve the free-flowing condition of rivers and streams with outstandingly remarkable values to provide for the enjoyment of present and future generations (PL 90-542:16; USC 1271-1287, as amended). To be eligible for designation as a wild and scenic river per the National Wild and Scenic Rivers Act (the Act), a river segment must meet two fundamental requirements: the river segment must be “free flowing” as defined by Section 16(b) of the Act, and the river segment must have one or more of the following outstandingly remarkable values: scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values [Section 1(b)]. The purpose of this wild and scenic river eligibility evaluation is to identify and classify eligible segments.

Segments that are identified as eligible could, in the future, be considered as suitable for inclusion in the National Wild and Scenic Rivers System. Further information on the eligibility and classification process for national wild and scenic rivers can be found in the Forest Service 2012 planning rule directives (FSH 1909.12 Chapter 80).

### **What Laws, Regulations, and Policies are Relevant to the Wild and Scenic River Process?**

#### ***National Wild and Scenic River System Act of 1968***

The National Wild and Scenic Rivers Act (the Act) of 1968 seeks to protect and enhance a river’s natural and cultural values and to provide for public use consistent with its free-flowing character, its water quality, and its outstandingly remarkable values. Each river in the National Wild and Scenic River System is administered to protect and enhance the values that caused the river to be designated. Where private lands are involved, the Federal managing agency works with local governments and owners to develop protective measures. Designation neither prohibits development on private lands nor gives the Federal Government control over those private lands.

As of the most recent designation in August 2018, the National Wild and Scenic River System consists of approximately 13,413 miles of 226 rivers in 41 states and the Commonwealth of Puerto Rico; this is a little more than one-half of one percent of the nation’s rivers (Interagency Wild and Scenic Rivers Coordinating Council 2019). These nationally recognized rivers make up a network of natural and cultural resources, scenic beauty, and recreational opportunities. There are currently no designated rivers in the GMUG National Forests, and only one within the State of Colorado.

#### ***The 2012 Planning Rule and Forest Service Handbook 1909.12, Chapter 80***

The Act, Section 5(d)(1) requires that, “consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas” during land management planning. To fulfill this requirement, the U.S. Department of Agriculture, Forest Service 2012 Planning Rule requires the agency to identify rivers eligible for inclusion in the National Wild and Scenic River System. This is required whenever the Forest Service undertakes the development or revision of a

land and resource management plan, commonly called a “forest plan.” This process is conducted in accordance with the planning directives at FSH 1909.12- Chapter 80.

## **What Steps are Included in the Wild and Scenic River Process?**

A wild and scenic river study process is composed of three main phases: eligibility, classification, and suitability. For this study, eligibility and preliminary classification phases were conducted in accordance with requirements. This study does not address suitability.

### ***Eligibility***

To meet requirements, Forest Service units conduct a systematic evaluation of river segments to determine if they are eligible for designation under the Act. There are four main components of this step:

- Identify all free-flowing named stream/river segments,
- Identify the region of comparison, which is used to provide a wide representation of river values so that segments can be meaningfully compared and those with outstandingly remarkable values can be identified,
- Modify and/or add outstandingly remarkable value criteria if warranted to ensure that each outstandingly remarkable value category is meaningful within the region of comparison, and
- Evaluate all free-flowing named streams and determine if they possess such outstandingly remarkable values within the region of comparison.

Eligible segments are managed to maintain their free-flowing nature and outstanding remarkable values until such time as they are determined to be suitable and designated for inclusion in the Wild and Scenic Rivers System by Congress or released from consideration (Wild and Scenic Rivers Act of 1968).

### ***Preliminary Classification***

All eligible rivers are assigned a preliminary classification based on the type and degree of human development and access associated with the river and adjacent lands, as they exist at the time of the study. The Act specifies and defines three classification categories: wild, scenic, and recreational, ranging from the least to the most developed. Eligible rivers may be divided into segments having differing classifications when the levels of human use and activity create different degrees of development within the study area. In cases where a river has one or more classification, each river segment identified should be of sufficient length to warrant its own unique management. Refer to table 57 for more details.

### ***Suitability***

While not evaluated in this study, the purpose of the suitability step is to determine whether eligible rivers are suitable or not for inclusion in the National Wild and Scenic River System, in accordance with the Act. Suitability considerations include the environmental and economic consequences of designation and the manageability of a river if Congress were to designate it. FSH 1909.12, Chapter 80, Section 83.2 identifies the various criteria that the Forest Service is to use for determining suitability. The suitability evaluation does not result in actual designation but only a determination of a river’s suitability for inclusion in the National Wild and Scenic River System. The primary means of designating America’s rivers as wild and scenic is congressional action, however, subject to certain prerequisites and conditions, Section 2(a)(ii) of the act authorizes the Secretary of the Interior

to include a river already protected by a state river protection program in the National System upon the request of that state's governor.

## **Final Wild and Scenic River Eligibility Study for the Grand Mesa, Uncompahgre, and Gunnison National Forests**

### **How Has Input From the Public Been Considered in the Wild and Scenic River Process?**

Between 2019 and 2021, the GMUG solicited informal and formal public comments on two draft versions of the eligibility report. Once the working draft eligibility report was prepared, the Forest Service solicited informal public feedback in early 2019. Improvements based on feedback from this period included clarification of the region of comparison, outstandingly remarkable values, and the preliminary classification, as well as identification of eligible segments; these were published in the 2021 Revised Eligibility Report. In the fall of 2021, formal public comments on the 2021 report resulted in the GMUG's reconsideration of all public-submitted segments and all segments previously studied and proposed for (draft) eligibility in 2006. Criteria used for the determination of outstandingly remarkable values were simplified for multiple categories of Outstandingly Remarkable Values (*see below for further discussion of the three-phase eligibility study process used, of particular relevance to the ORV criteria*).

### **Has the GMUG Previously Conducted the Wild and Scenic River Process?**

Prior to evaluation, the Interdisciplinary Team reviewed the following two eligibility evaluations to determine if segments needed to be re-evaluated:

1. 1983 Land and Resource Management Plan (USDA Forest Service 1983)

Though a comprehensive evaluation of all segments was not conducted during the development of this plan, the GMUG evaluated several rivers. The East River was evaluated from its headwaters at Emerald Lake to its confluence with the Taylor River in four segments (33.5 miles). Portions of the Taylor River from its headwaters in Eyer Basin to its confluence with Illinois Creek were evaluated in three segments (18.3 miles). The upper segments of the East River were recognized as being very scenic; however, neither the East River nor the Taylor River were evaluated as having outstandingly remarkable values and therefore were not considered eligible for inclusion in the National Wild and Scenic River System in 1983. No additional wild and scenic river evaluations were conducted for the 1991 GMUG plan amendment.

2. 2007 Proposed Land Management Plan (USDA Forest Service 2007):

A wild and scenic river eligibility evaluation was initiated as part of the plan revision effort undertaken between 2001 and 2007. This evaluation is documented in the 2006 Comprehensive Assessments (Chapter 6 of the Human Dimensions volume, USDA Forest Service 2006b) and summarized in the 2006 Comprehensive Evaluation Report (USDA Forest Service 2006b). Eighteen river segments, 76.6 miles, were identified as potentially eligible for further study in the 2007 Proposed Land Management Plan (USDA Forest Service 2007). Forest planning was suspended in 2007 following a court injunction of the 2005 Planning Rule, and the proposed plan and the 2006 eligibility study were not finalized.

In addition to the fact that the 2006 eligibility study was never finalized, there are additional reasons for not incorporating those draft eligible segments wholesale into this process:



- We could not locate any supporting documentation for why some segments were found draft eligible in 2006. Without that documentation, we cannot compare these segments to the current criteria used; they would be an entirely separate set, with some kind of justification that didn't align with the other contemporary segments. We also cannot indicate why to include them.
- As discussed in the following section, best available science has identified factors such as the unique existence of the green-lineage Colorado River cutthroat trout in the GMUG, enabling more current comparison between the relative habitat values of different areas.

The "Initial Notes" spreadsheet published online in 2019 for the Working Draft Eligibility report include references to the 2006 comprehensive assessment, appendix W-2, which indicate which segments were studied at that time, and which statements were proposed as draft eligible. The "Initial Notes" records whether the segment was reviewed in 2006 or not; and whether it was found eligible or not. These notes are not "reasons for including as eligible/ineligible." Irrespective of the 2006 process, for which there is no supporting documentation, all segments evaluated in this planning process were consistently evaluated; extra consideration by the planning team was also given to those segments proposed in 2006.

## How Was New Direction and Information Considered in Developing the GMUG's Current Wild and Scenic River Eligibility Study?

In addition to not finalizing the previous study, new information and changed circumstances demand that segments be re-evaluated. Since the previous study was initiated, the 2012 Planning Rule and directives (FSH 1909.12, Chapter 80) were developed, and the previous eligibility evaluation processes did not fulfill the evaluation requirements under this new direction. For example, not all named streams were evaluated; updated mapping highlighted approximately 600 segments that were not considered in the previous effort.

Additionally, in the 15 years since the previous eligibility study was initiated, circumstances have also changed:

1. Species presence information and classification has changed. Green lineage Colorado River cutthroat trout (a hybrid of *Oncorhynchus larkia pleuriticus* and *Oncorhynchus larkia stomias*) is considered by the U.S. Fish and Wildlife as a threatened species under the Endangered Species Act, and this hybrid species is known to occur in the GMUG (Colorado River Cutthroat Trout Assessment (Young 2008)). GMUG biologists have identified additional populations of western toad (previously named the "boreal toad") (*Anaxyrus boreas*), a State-protected endangered species in Colorado (Boreal Toad Assessment (Keinath and McGee 2005)), within river corridors in the GMUG forests. Global and state plant species rankings have changed for water-dependent plant species and community types that could potentially be considered outstandingly remarkable values. This new species information was considered in the current evaluation and is referenced where pertinent in evaluation results described later in this document.
2. Wild and scenic river eligibility and suitability evaluations have been completed for federally managed areas adjacent to the GMUG that involve river and stream segments contiguous with segments in the GMUG. The Grand Junction Field Office of the Bureau of Land Management completed wild and scenic river eligibility (2009) and suitability (2015) studies, as part of their 2015 Resource Management Plan. The Uncompahgre Field Office completed the wild and scenic river eligibility study (2010), and suitability study (2013) as part of the resource management planning process. The Dominguez-Escalante National Conservation Area, designated in 2009, includes parts of both the Grand Junction Field Office and Uncompahgre Field Office. The Bureau of Land Management Dominguez-Escalante National Conservation Area completed a

suitability study for eligible river segments identified by both the Grand Junction Field Office and Uncompahgre Field Office in 2017 (USDI BLM 2017). Eligibility and suitability determinations from these Bureau of Land Management analyses were considered when evaluating contiguous river segments in the GMUG. Some of the Forest Service-managed river segments are located on the same river as Bureau of Land Management-managed eligible and/or suitable river segments. However, Bureau of Land Management planning regulations differ from the planning rules required of the Forest Service as provided in Chapter 80 of the 2012 Planning Rule. The Forest Service must conduct its own eligibility evaluation of river segments within the GMUG boundary as required under the direction of the Rule.

3. The Nationwide Rivers Inventory is maintained by the National Park Service as a list of potential candidates for the National Wild and Scenic River System (USDI NPS 2017). Information contained in the Nationwide Rivers Inventory appears to be outdated or incorrect. The East River and Taylor River segments were evaluated for the 1983 GMUG Land and Resource Management Plan as not eligible. A short portion of Coal Creek located in the GMUG, but also within Curecanti National Recreation Area managed by the National Park Service, is listed as potentially eligible in the Nationwide Rivers Inventory. Follow-up with Curecanti National Recreation Area personnel determined that the section in question is very short (800 feet), above the high-water line of the reservoir and, therefore, free flowing. However, the National Park Service hydrologist stated this river segment does not contain outstandingly remarkable values for aquatic life or riparian vegetation (personal communication with Michael Dale, 2018). A portion of Lake Fork (of the Gunnison) from Sloan Lake to Wager Gulch, southwest of Lake City, is also included in the Nationwide Rivers Inventory. This segment is, primarily, on public land managed by the Bureau of Land Management and private land upstream of the GMUG. Numerous ditch diversions to feed fishponds on the private land impact the streamflow below these diversions. Because the Lake Fork is not free flowing downstream from this point, the portion of this segment in the GMUG is not eligible. Because of changed circumstances since the time that the Nationwide Rivers Inventory was conducted, all the segments in the GMUG identified by the Nationwide Rivers Inventory were re-evaluated in this study and results are documented below.
4. Improved and new data are now available for use in determining whether stream/river segments meet eligibility criteria.

As the previous eligibility study was not finalized, new guidance has been provided, and changed circumstances must be considered, an improved process and a comprehensive evaluation of all segments were determined necessary for the GMUG to meet the requirements at FSH 1909.12, Chapter 80.

### **What Method is Used to Identify Stream Segments?**

Given the above information, the GMUG is conducting the eligibility and preliminary classification steps in accordance with requirements as part of the plan revision effort. This study does not address suitability. The directives (FSH 1909.12, Sec. 82.2) specify that “rivers to be studied for eligibility include all rivers named on a standard U.S. Geological Survey 7.5-minute quadrangle map.” While traditional U.S. Geological Survey quad maps have not been made since 2009, the U.S. Geological Survey launched the National Geospatial Program and started to create digital topography maps modeled on the familiar 7.5-minute quads, using a digital repository of all stream reaches called the National Hydrography Dataset. Given this improvement in technology and as the most comprehensive source of named rivers, the Forest Service has determined that the National Hydrography Dataset constitutes best available scientific information. The National Hydrography Dataset includes 876 named perennial and intermittent river and stream segments totaling 3,610



miles in the GMUG. All named perennials and intermittent segments evaluated in the GMUG for eligibility as a wild and scenic river are indicated in the 2021 Draft GMUG Eligibility Report, published as appendix 11 of the draft forest plan.

## **What Determines Whether a Segment is Free-Flowing?**

Section 16(b) of the Act defines free flowing as follows:

...existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers systems shall not automatically bar its consideration for inclusion: provided, that this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

Congress has allowed for some human modification of a watercourse. Because of this, impoundments or major dams above or below a segment under review, and any minor dams, diversion structures, and riprap in the segment, do not by themselves render a segment ineligible. This includes those impoundments or dams that may regulate flow through the segment. Rivers impacted by such water resource developments may still be eligible, as long as they remain riverine in appearance. To be considered free flowing for this evaluation, a river needed to maintain its natural stream functions, including a natural flood regime, natural sinuosity and channel shifting, natural bank erosion, and natural bed load and debris movement.

There are no specific requirements concerning minimum flow for an eligible segment. Flows are considered sufficient for eligibility if they sustain or complement the outstandingly remarkable values for which the segment would be designated. Rivers that are found not to be free flowing are ineligible and need not be considered further.

## **What is the Region of Comparison and How Is It Applied?**

The region of comparison is a geographic area that provides the basis for meaningful comparative analysis of potentially eligible rivers. The Forest Service identifies the region of comparison for each outstandingly remarkable value, and this may vary for different rivers or categories of outstandingly remarkable values, or the responsible official may conclude that a single region of comparison can encompass the evaluation of all outstandingly remarkable values. Once the region of comparison is identified, a river's values can then be analyzed in comparison with other rivers in that area.

During development of the 2019 Working draft eligibility report, the team initially attempted to apply the same regions of comparison applied during the GMUG's 2006 draft eligibility study, which included the appropriate ecological units for scenery, geology, wildlife, and fish values, and the State of Colorado for recreation, history, and cultural values (USDA Forest Service 2006b). Feedback from the public highlighted discrepancies in the application of this concept and the need to correct this for the 2021 Revised Eligibility Report. In considering how to improve, the team discussed many different regions of comparison such as the GMUG National Forest boundary, the Rocky Mountain Region, and the State of Colorado. As the GMUG is large with a wide variety of unique resource and river values, to be scaled at an appropriate level to adequately compare and study the segments, it was recognized that a region of comparison larger than the GMUG boundary would be necessary. Conversely, it was decided that the Rocky Mountain Region would be too large for specialists to understand well enough to meet this requirement. Finally, the State of Colorado was determined to be acceptable as the region of comparison, encompassing similar rivers that provide a wide representation of river values so that rivers with outstandingly remarkable values can be identified (FSH 1909.12, Ch 80, 82.73), thus providing the basis for meaningful comparative

analysis for all outstandingly remarkable values. This region of comparison was used in the 2021 revised eligibility and now the final eligibility reports.

## **How Have Outstandingly Remarkable Values (ORVs) been Defined?**

The Act establishes a set of categories for determining the outstandingly remarkable values (ORVs) for resource areas, and the Forest Service has further established baseline criteria per FSH 1909.12, 82.73a. These criteria “set *minimum* thresholds to establish outstandingly remarkable values. The criteria within the category may be modified and additional criteria may be included to make them more meaningful in the region of comparison” (emphasis added).

ORVs were identified through a three-stage, iterative process using public comments over a four-year period. The first phase began with initial District staff discussions in 2018 for each of the five GMUG Districts, which considered all segments required to be studied and the GMUG 2006 Comprehensive Assessments/draft 2006 Eligibility Report. Their considerations were the starting point, but were followed by Planning Interdisciplinary Team review that modified some of the evaluation criteria for each outstandingly remarkable value to be more meaningful within the State of Colorado, per authorities in the policy directives noted above. District and Interdisciplinary Team work was resolved with initial responsible official decisions, and this phase one work resulted in the 2019 Working Draft Eligibility Report.

In the second phase of the eligibility study, the planning team used the public comments on the 2019 Working Draft Eligibility Report to clarify and to refine the study process. Public comments requested clarification for how the Planning Interdisciplinary Team refined the initial District staff recommendations in phase one. The 2021 Revised Eligibility Report (GMUG draft forest plan, appendix 11) further specified how each of the ORV criteria were applied and modified by the Planning Interdisciplinary Team in phase one, and again applied during consideration of public comments on the 2019 Working Draft Eligibility Report in phase two. The result of phase two was the 2021 Revised Eligibility Report, published for public comment in fall 2021.

In the third phase, the planning team incorporated public comments on the 2021 Revised Eligibility Report to develop the final 2023 Eligibility Report. The ORV process concluded with reconsidering each public-recommended segment and each public-recommended ORV (considering comments in both 2019 and 2021). The planning team applied a third, hard look at these segments and ORVs, and revised the process to rely primarily only on the original ORV criteria as detailed in the Forest Service Handbook (*see exceptions below in table 56 for further ORV definition applied to the fisheries, wildlife, cultural/historical, and botany categories*). This third review also included a review of all of the proposed segments from the GMUG’s draft 2006 eligibility report. In some cases, this third review was conducted with fresh eyes from a professional geologist (geology and paleontology), in other cases by updating and correcting prior GIS analyses (botany), and for all, thorough discussion and resolution at both the District and Planning Interdisciplinary Team levels. The responsible official approved all staff-recommended segments as eligible, and their corresponding ORVs, that resulted from the phase three work.

**Table 55. Outstandingly remarkable value criteria specific to the selected region of comparison, as applied in the GMUG eligibility study**

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Scenery	<p>The landscape elements of landform, vegetation, water, color, and related factors result in extraordinary or exemplary visual features or attractions.</p> <p>Additional factors, such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed may be considered. Scenery and visual attractions may be highly diverse over different parts of the river or river segment. Outstandingly remarkable scenic features may occupy only a small portion of a river corridor.</p>	No additional criteria applied.	<ul style="list-style-type: none"> <li>• Mapped scenic attractiveness</li> <li>• Mapped scenic class</li> <li>• Mapped existing scenic integrity</li> <li>• Mapped and known infrastructure such as roads and bridges</li> <li>• Aerial photos</li> <li>• Staff knowledge and public comments</li> </ul>
Recreation	<p>Recreational opportunities are high quality and attract, or have the potential to attract, visitors from throughout or beyond the region of comparison; or the recreational opportunities are unique or rare within the region. River-related recreational opportunities include, but are not limited to, sightseeing, interpretation, wildlife observation, camping, photography, hiking, fishing, hunting, and boating. The river may provide settings for national or regional use or competitive events.</p>	No additional criteria applied.	<ul style="list-style-type: none"> <li>• Recreation special use permit data</li> <li>• Forest Service recreation amenities</li> <li>• Forest Service routes</li> <li>• Recreation opportunity spectrum settings</li> <li>• Expert opinion</li> <li>• Feedback left on the <a href="https://www.recreation.gov">Recreation.gov</a> website</li> <li>• National or regional river inventories (e.g. National Whitewater Inventory maintained by American Whitewater)</li> <li>• Public comments</li> <li>• Colorado Parks and Wildlife-designated Gold Medal waters</li> </ul>

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Geology	The river corridor contains one or more examples of a geologic feature, process, or phenomenon that is unique, rare, or exemplary within the region of comparison. The feature(s) may be in an unusually active stage of development, represent a “textbook” example, or represent a unique, rare, or exemplary combination of geologic features (erosional, volcanic, glacial, or other geologic structures).	No additional criteria applied.  Note some segments were recommended for both geology and paleontological value by the public. During site-specific review, the forest geologist evaluated recommended segments for their paleontological value; <i>see row below in this table</i> .	<ul style="list-style-type: none"> <li>• Forest Service geologic GIS data</li> <li>• Expert opinion, including site reviews</li> <li>• Public comments</li> </ul>
Fisheries	<p>Fish values may be judged on the relative merits of either fish populations or habitat, or a combination of these river-related conditions.</p> <p><b>Populations.</b> The river is nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance are a diversity of fish species or the presence of wild stocks and/or Federal or State-listed or candidate threatened, endangered, or Species of Conservation Concern.</p> <p><b>Habitat.</b> The river provides uniquely diverse or high-quality habitat for fish species indigenous to the region of comparison. Of particular significance is exemplary habitat for wild stocks and/or Federal- or State-listed or candidate threatened or endangered species, or Species of Conservation Concern. Consider also rare and unique habitats within the corridor.</p>	<ul style="list-style-type: none"> <li>• Core conservation populations indicate greater than 99 percent genetic purity.</li> </ul>	<ul style="list-style-type: none"> <li>• Colorado Parks and Wildlife fish population genetic database data</li> <li>• Forest Service infrastructure data</li> <li>• Forest Service invasives data</li> <li>• Forest Service habitat data</li> <li>• Expert opinion</li> <li>• Public comments</li> </ul>

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Wildlife	<p>Wildlife values may be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat, or a combination of these conditions.</p> <p><b>Populations.</b> The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species diversity, species considered to be unique, and/or populations of Federal or State-listed or candidate threatened or endangered species, or Species of Conservation Concern.</p> <p><b>Habitat.</b> The river, or area within the river corridor, provides uniquely diverse or high-quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for Federal- or State-listed or candidate threatened or endangered species, or Species of Conservation Concern. Contiguous habitat conditions are such that the biological needs of the species are met.</p>	<p>ORVs must be river-dependent, so the planning team identified species that are river-dependent for aspects of their life cycles or movements and limited the list to those at-risk (either federally listed or Species of Conservation Concern).</p> <p>For the GMUG, populations of western toad (previously named the “boreal toad”) (a Species of Conservation Concern) that are chytrid-free and breeding meet these criteria.</p> <p>Species considered during the process, but that did not meet these criteria included:</p> <ul style="list-style-type: none"> <li>• River otter</li> <li>• Black swifts</li> <li>• Bald eagle</li> <li>• Northern leopard frog</li> <li>• Heron nesting</li> <li>• Elk production area</li> <li>• Gunnison sage-grouse habitat</li> </ul> <p>Note that no data was available to differentiate wildlife species diversity between segments, and no <i>unique</i> river-dependent species (other than those at-risk) could be identified.</p>	<ul style="list-style-type: none"> <li>• Forest Service and Colorado Parks and Wildlife habitat data</li> <li>• Bird Conservancy of the Rockies data</li> <li>• Forest Service infrastructure data</li> <li>• Forest Service invasives data</li> <li>• Expert opinion</li> </ul>

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Historic and Cultural Values	<p><b>Historic and Cultural Values.</b> The river, or area within the river corridor, contains important evidence of historic or pre-historic occupation or use by humans. Sites may have national or regional importance for interpreting history or prehistory.</p> <p><b>History.</b> Sites or features are associated with a significant event, an important person, or a cultural activity of the past that is now rare or unique in the region. A historic site or feature, in most cases, is 50 years old or older.</p> <p><b>Prehistory.</b> Sites of prehistoric human use or occupation may have unique or rare characteristics or exemplary anthropological value such as evidence of prehistoric human practices and modes of living. Areas within the river corridor may have been used for rare sacred purposes or represent the origin or conflict of cultures.</p>	<p>The segment contains:</p> <ul style="list-style-type: none"> <li>• Prehistoric site(s) (prior to AD 1765) and/or historic site(s) (AD 1765 or later) considered Priority Heritage Asset(s) that demonstrate unique, rare, or exemplary anthropological value within the State of Colorado.</li> </ul> <p>Priority Heritage Assets by definition are eligible for or listed on the National Register of Historic Places.</p>	<ul style="list-style-type: none"> <li>• Natural Resource Management Heritage Application</li> <li>• Expert opinion</li> <li>• Public comments</li> </ul>
Ecological and Botanical Values (Other)	<p>While no specific national evaluation guidelines have been developed for this category, determinations consistent with the preceding guidance and section 82.73 of this Handbook may be developed for other values that may be outstandingly remarkable, including but not limited to botanic, hydrologic, palaeontologic, scientific, and heritage values.</p>	<p>The segment corridor contains:</p> <ul style="list-style-type: none"> <li>• Rare plants identified by the Colorado Natural Heritage Program ranked as G1 or S1 (globally or subnationally ranked critically imperiled) or G2 or S2 (globally or subnationally ranked imperiled),</li> <li>• Community types ranked as G1 or S1 or G2 or S2, AND</li> <li>• Colorado Natural Heritage Program Potential Conservation Areas with biodiversity significance rankings of B1 (outstanding biodiversity significance) or B2 (very high biodiversity significance).</li> </ul>	<ul style="list-style-type: none"> <li>• Colorado Natural Heritage Program Natural Communities data</li> <li>• Expert opinion</li> </ul>

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Scientific Research; Climate Change (Other)	While no specific national evaluation guidelines have been developed for these categories, determinations consistent with the preceding guidance and section 82.73 of this Handbook may be developed for other values that may be outstandingly remarkable, including but not limited to botanic, hydrologic, palaeontologic, scientific, and heritage values.	<p>These potential ORV categories were considered due to public comments recommending these be applied to specific segments.</p> <p>The planning team did not determine a “scientific research” category to be applicable in the GMUG; those segments well-studied are already identified as an ORV for geology and inherent to that criteria (e.g., “textbook example”; see <i>above</i>). Category not carried forward.</p> <p>The planning team agrees that all riparian areas are of particular ecological value now and given current and future climate change; however, the planning team determined there is currently no meaningful way to differentiate higher value for some streams as climate refugia, other than as already represented in the wildlife and fish values above, nor did public comments provide any method to differentiate. Category not carried forward.</p>	<ul style="list-style-type: none"> <li>Expert opinion</li> </ul>

Outstandingly Remarkable Value	Minimum Criteria Established in Forest Service Handbook 1909.12 Ch 80 82.73a	Definition <sup>1</sup> /Notes	Data and Information Considered <sup>2</sup>
Paleontology (Other)	While no specific national evaluation guidelines have been developed for this category, determinations consistent with the preceding guidance and section 82.73 of this Handbook may be developed for other values that may be outstandingly remarkable, including but not limited to botanic, hydrologic, palaeontologic, scientific, and heritage values.	<p>The segment contains an amount and/or diversity of fossils that provides a significant contribution to the science of paleontology and a unique educational opportunity to share the earth's history.</p> <p>Existing paleontology data for the GMUG is very broad and based on predictive models. See <a href="#">GMUG Paleontological Resources Assessment</a>. Relied upon cooperating agencies as well as public input to determine which segments may have outstandingly remarkable paleontological values.</p> <p>Note some segments were recommended for both geology and paleontological value by the public. During site-specific review, the forest geologist evaluated recommended segments for their paleontological value.</p>	<ul style="list-style-type: none"> <li>Expert opinion</li> </ul>

<sup>1</sup> Forest Service Handbook minimum criteria modified to be more meaningful to identify the unique, rare, or exemplary features in the GMUG as compared with those within the State of Colorado. (FSH1909.12\_80, Sec 82.73a)

<sup>2</sup> It is important to note that geospatial data serves as a starting point for taking stock of segments that may qualify for inclusion in the National Wild and Scenic River System, and that this information is then considered in the context of expert opinion and public feedback for all outstandingly remarkable value categories.

## What Guides Preliminary Classification?

As mentioned in the introduction, all eligible rivers are assigned a preliminary classification/s of wild, scenic, or recreational based on the type and degree of human development and access associated with the river and adjacent lands. An eligible river may have different classifications along its course. Criteria guiding the classification are provided in table 57 (from FSH 1909.12\_80, 82.8, Exhibit 01 to include data sources).

The classification/s assigned during the eligibility phase is preliminary and does not reflect the type of values present along a river segment. Determining a preliminary classification establishes a guideline for management until either a suitability determination or a designation decision is reached. Final classification is a congressional legislative determination that occurs if the river is formally designated by Congress or the Secretary of the Interior.



**Table 56. Classification criteria for wild, scenic, and recreational preliminary classifications**

[Source: Modified from FSH 1909.12 – Land Management Planning Handbook, Chapter 80 – Wild and Scenic Rivers, 82.8 – Exhibit 01; modified to include data sources considered]

Attribute	Wild	Scenic	Recreational
<p>Water resource development</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Aerial imagery</li> <li>National Hydrography Dataset</li> <li>Forest Service infrastructure data</li> </ul>	<p>Free of impoundment</p>	<p>Free of impoundment</p>	<p>Some existing impoundments or diversion. The existence of low dams, diversions, or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.</p>
<p>Shoreline Development</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Aerial imagery</li> <li>Forest Service infrastructure data</li> <li>Livestock grazing allotment data</li> <li>Timber harvest data</li> <li>Rights-of-way data</li> </ul>	<p>Essentially primitive; little or no evidence of human activity.</p> <p>The presence of a few inconspicuous structures, particularly those of historic or cultural value, is acceptable. A limited amount of domestic livestock grazing or hay production is acceptable. Little or no evidence of past timber harvest. No ongoing timber harvest.</p>	<p>Largely primitive and undeveloped. No substantial evidence of human activity. The presence of small communities or dispersed dwellings or farm structures is acceptable.</p> <p>The presence of grazing, hay production, or row crops is acceptable.</p> <p>Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.</p>	<p>Some development. Substantial evidence of human activity.</p> <p>The presence of extensive residential development and a few commercial structures is acceptable. Lands may have been developed for the full range of agricultural and forestry uses.</p> <p>May show evidence of past and ongoing timber harvest.</p>
<p>Accessibility</p> <p>Sources:</p> <ul style="list-style-type: none"> <li>Roads and trails data</li> <li>Rights-of-way data</li> <li>Boat ramp data</li> </ul>	<p>Generally inaccessible except by trail.</p> <p>No roads, railroads, or other provisions for vehicular travel in the river area. A few roads leading to the boundary of the area are acceptable.</p>	<p>Accessible in places by road.</p> <p>Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of inconspicuous roads or railroads is acceptable.</p>	<p>Readily accessible by road or railroad.</p> <p>The existence of parallel roads or railroads on one or both banks; bridge crossings; and other river access points is acceptable.</p>

Attribute	Wild	Scenic	Recreational
Water Quality Sources: State 303(d) list	Meets or exceeds criteria or federally approved State standards for aesthetics, for propagation of fish, and for wildlife normally adapted to the habitat of the river and for primary contact recreation (swimming), except where exceeded by natural conditions.	No criteria are prescribed by the Wild and Scenic Rivers Act. The Federal Water Pollution Control Act Amendments of 1972 have made it a national goal that all Waters of the United States be made fishable and swimmable; therefore, rivers will not be precluded from scenic or recreation classification because of poor water quality at the time of their study, provided a water quality improvement plan exists or is being developed, in compliance with applicable Federal and State laws.	Same as scenic.

## Eligible Segments - Eligible for Inclusion in the National Wild and Scenic River System

The final eligibility report identifies 118 miles across 22 river and stream segments and one lake as eligible for inclusion in the National Wild and Scenic River System. Segments identified as eligible for wild and scenic river designation are provided in figure 8 and table 58. Detailed descriptions and maps of each of the eligible streams, rivers, and lake are provided below.

**Table 57. GMUG Eligible wild and scenic river segments**

Name	Length <sup>1</sup>	Eligible Corridor Area on National Forest System lands <sup>2</sup> (acres)	Ranger District	County	ORV	Preliminary Classification/s
Anthracite Creek	3.3	1,110	Paonia	Gunnison	Scenery	Wild, recreational
Bear Creek	4.7	1,350	Ouray	Ouray	Geology, Recreation, Scenery	Wild, recreational
Big Blue Creek	1.0	390	Gunnison	Gunnison	Heritage	Scenic
Canyon Creek	1.5	370	Ouray	Ouray	Botany	Recreational
Cement Creek	2.4	580	Gunnison	Gunnison	Botany	Recreational
Coal Creek	0.6	310	Gunnison	Gunnison	Botany	Recreational
Copper Lake, Copper Creek and Tributaries	10.0	2,530	Gunnison	Gunnison	Wildlife	Wild, recreational
Cow Creek and Tributaries	10.1	3,190	Ouray	Ouray	Scenery	Wild
East River	3.0	660	Gunnison	Gunnison	Geology	Scenic
Fall Creek	2.5	910	Norwood	San Miguel	Fish	Wild
Kelso Creek	13.2	3,750	Grand Valley	Mesa	Fish	Wild, recreational
Lake Fork	0.8	270	Norwood	San Miguel	Heritage	Recreational
Muddy Creek	2.7	830	Norwood	San Miguel	Fish	Wild
North Fork Escalante Creek	12.6	3,500	Grand Valley	Mesa	Fish	Wild, recreational
Oh Be Joyful and tributaries	11.1	3,140	Gunnison	Gunnison	Scenery, Botany	Wild, recreational
Points Creek	3.4	1,170	Grand Valley	Mesa	Fish	Wild
Quartz Creek	0.8	360	Gunnison	Gunnison	Heritage	Recreational
Red Mountain Creek	0.6	280	Ouray	Ouray	Heritage	Recreational

*Grand Mesa, Uncompahgre, and Gunnison National Forests  
Revised Land Management Plan*

<b>Name</b>	<b>Length<sup>1</sup></b>	<b>Eligible Corridor Area on National Forest System lands<sup>2</sup> (acres)</b>	<b>Ranger District</b>	<b>County</b>	<b>ORV</b>	<b>Preliminary Classification/s</b>
San Miguel River	0.4	340	Norwood	Montrose, San Miguel	Recreation, Wildlife, Paleontology	Wild, recreational
Tabeguache Creek and North Fork Tabeguache Creek	8.5	2,660	Norwood	Montrose	Scenery, Heritage	Wild
Taylor River (Lower)	16.6	4,710	Gunnison	Gunnison	Recreation	Recreational
Uncompahgre River	2.7	660	Ouray	Ouray	Recreation	Recreation
<b>Total</b>	<b>112.5</b>	<b>33,070</b>				Preliminary Classification/s

<sup>1</sup> Includes length on both GMUG National Forest System and non-National Forest System lands. See *segment descriptions below* for total length on just National Forest System lands.

<sup>2</sup> Includes area only on GMUG National Forest System lands.

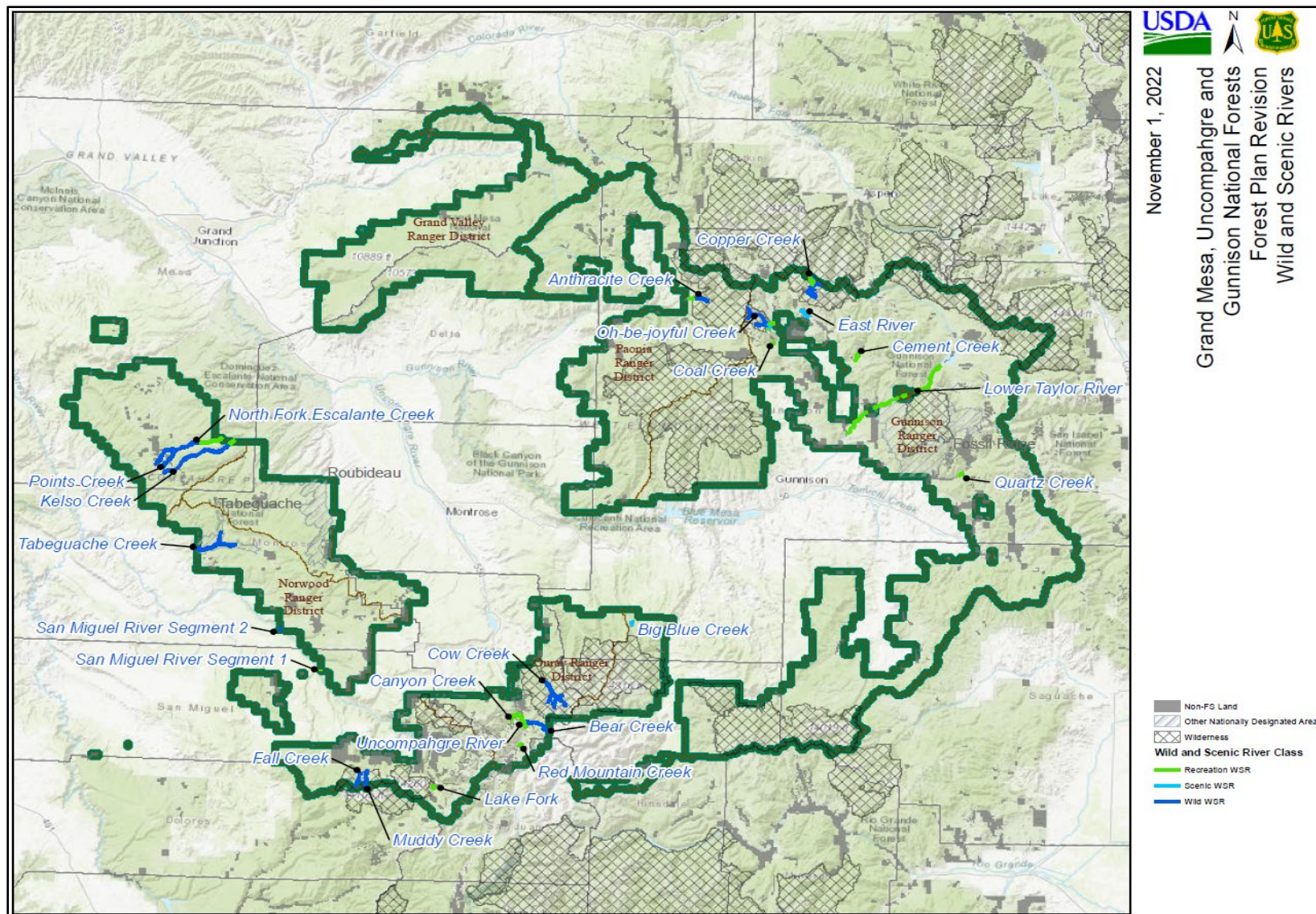


Figure 8. GMUG Eligible wild and scenic river segments

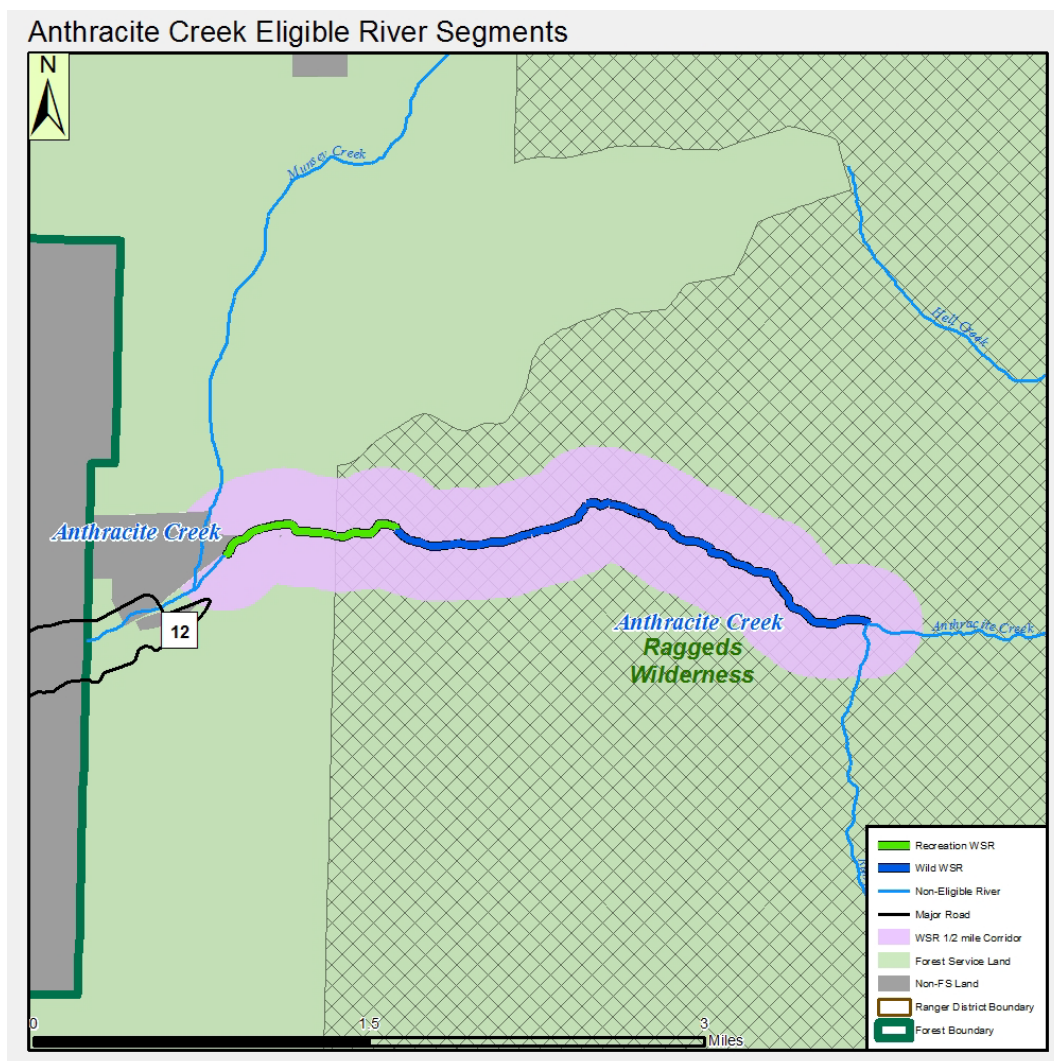


## Segment Descriptions and Maps

The section below offers more detail about the individual segments that are eligible wild and scenic rivers. Included are locations, area maps, segment lengths, corridor acres, identification of any sub-segments, descriptions of outstandingly remarkable values, and rationale for preliminary classification. Total length and acres are estimates from geographical information systems at the time the evaluation was conducted. “Total” lengths include the entire segment regardless of land ownership. “Eligible lengths and acres on national forests” excludes all non-National Forest System land such as private inholdings, mining claims, and public lands under other jurisdictions.

### ***Anthracite Creek (P-1)***

Location: Paonia District, Gunnison County. From the confluence with Ruby Anthracite Creek in the Raggeds Wilderness to about 0.2 mile upstream of the confluence with Munsey Creek near Erickson Springs Campground. T.13S., R.88W; Sections 3, 4, 5, and 6 (figure 9).



**Figure 9. Eligible wild and scenic river segments for Anthracite Creek**

Total length (miles): 3.3

Eligible length on National Forest System lands (miles): 3.3

Eligible corridor area on National Forest System lands (acres): 1,110

Preliminary classification: Wild, Recreational

Outstandingly remarkable value: Scenery

*Description of Outstandingly Remarkable Value*

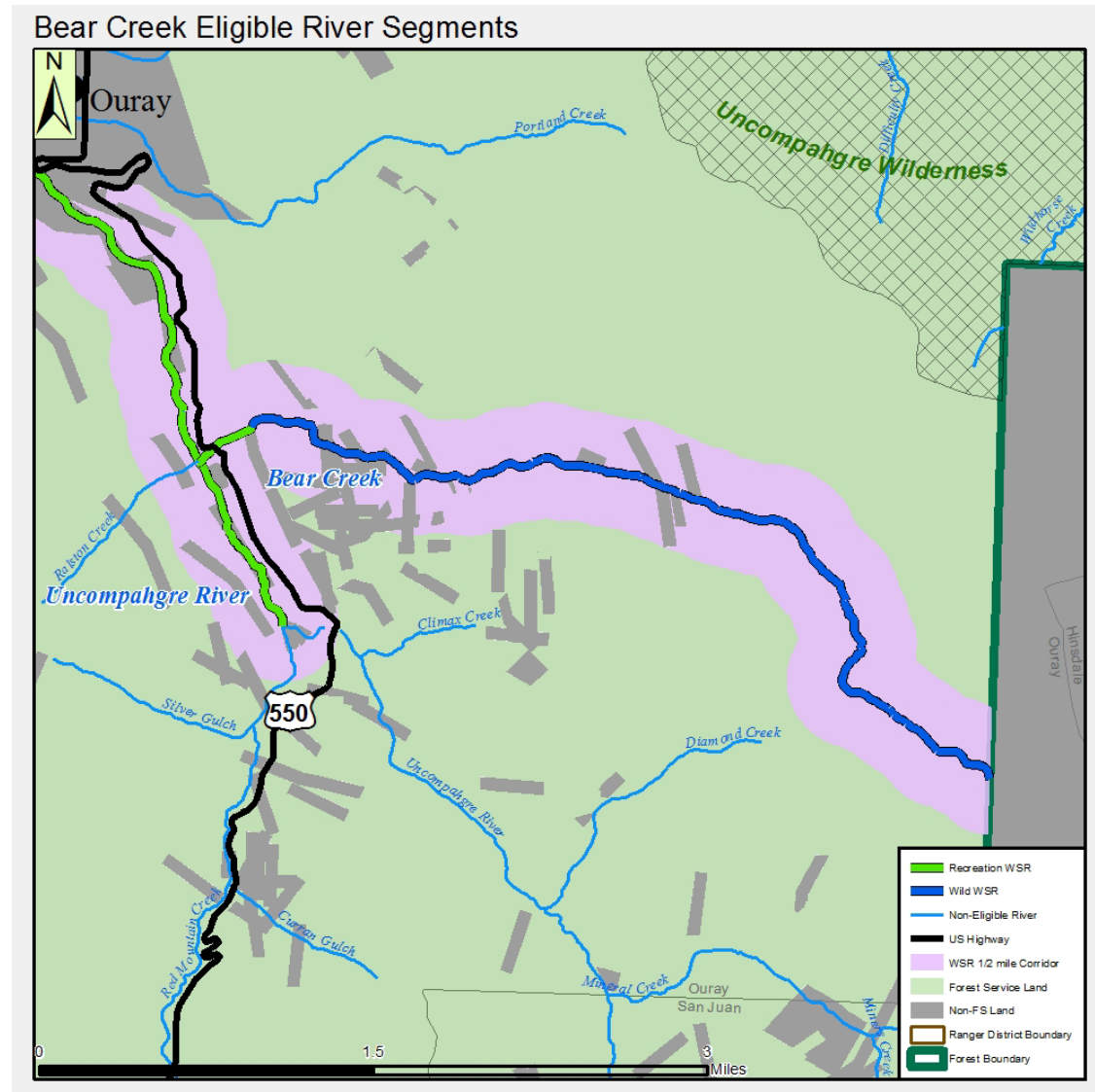
The scenery within Dark Canyon amounts to an outstandingly remarkable value. The river offers excellent views of Marcellina Mountain unique to Anthracite Creek. Dark Canyon features cliff walls and towering vistas that rise hundreds of feet from the river. Whitewater enthusiasts, anglers and hikers enjoy the exemplary scenery that this section of Anthracite Creek offers.

*Rationale for Preliminary Classification:*

From the confluence of Ruby Anthracite Creek downstream to approximately 1 mile east of Erickson Springs Campground, Anthracite Creek is preliminarily classified as wild. The area is generally inaccessible, except by trail, and is located within the Raggeds Wilderness area. From approximately 1 mile east of Erickson Springs campground downstream to the west end of Dark Canyon, Anthracite Creek is preliminarily classified as recreational. This section can be accessed by road at the Dark Canyon trailhead and Erickson Springs Campground.

## Bear Creek (O-4)

*Location:* Ouray District, Ouray County. From the forest boundary west of Darley Mountain downstream to the confluence with the Uncompahgre River. T.43SN, R.07W., Sections 8, 9, 10, 11 and 14 and 34 (figure 10).



**Figure 10. Eligible wild and scenic river segments for Bear Creek**

Total length (miles): 4.7

Eligible length on National Forest System lands (miles): 4.1

Eligible corridor area on National Forest System lands (acres): 1,350

Preliminary classifications: Wild, Recreational

Outstandingly remarkable values: Geology, Scenery, Recreation

*Description of Outstandingly Remarkable Value*



Bear Creek boasts three geological attributes unique to the region of comparison. First are the exceptional exposures of Precambrian Uncompahgre Formation. Equally important in Bear Creek Canyon are exposures of the pronounced angular unconformity between the underlying Precambrian Uncompahgre Formation and the overlying Oligocene San Juan Formation. Lastly, the Oligocene San Juan Formation in Bear Creek offers important clues about the evolution of the earlier Tertiary landscape in this area.

Bear Creek is also paralleled by the Bear Creek National Recreation Trail, which draws tourists from across the country. Proximity to the tourist destinations of Ouray and Silverton, and with its trailhead starting from a mountainous, highly traveled, national scenic byway contribute to the trail's popularity, particularly in the summer months.

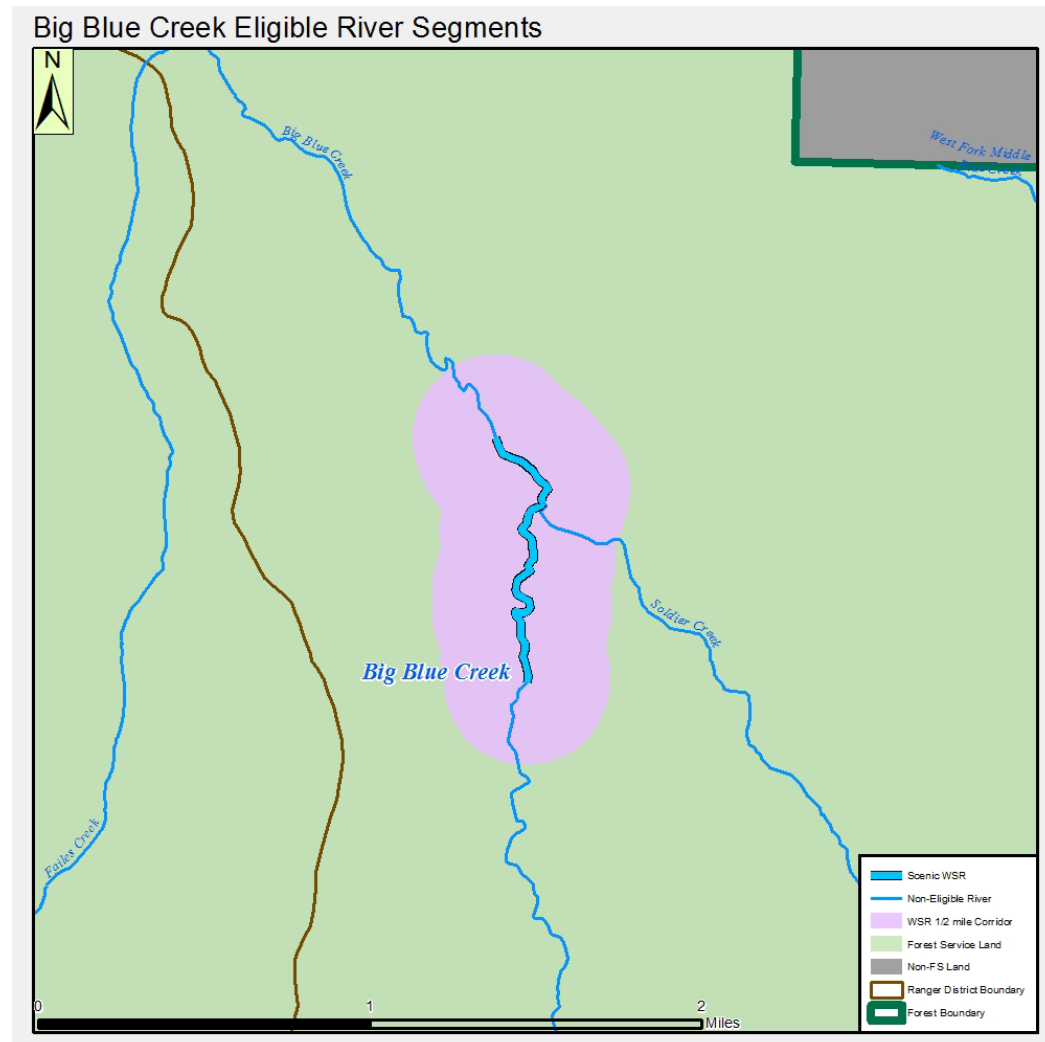
The exemplary scenery throughout the entire eligible segment is highlighted by Bear Creek Falls, which can be viewed from a large pullout on State Highway 550 and is heavily photographed. Bear Creek's consistently steep gradient, towering mountain walls, and deeply incised stream channel are punctuated by numerous cascades and waterfalls.

#### *Rationale for Preliminary Classification*

Bear Creek can be subdivided into two preliminary classifications based primarily on their proximity to State Highway 550. From the downstream, westernmost segment, highway 550 can be seen and heard fairly easily, qualifying this portion as a recreational classification. While accessing the stream channel in this segment is largely impossible due to its rugged, steep, and deeply incised characteristics, most visitors will view this portion from the viewing platform on the highway. Upstream of this segment, however, sights and sounds of the highway dissipate almost immediately and can only be accessed from the Bear Creek National Recreation Trail. From this point upstream a preliminary classification of wild best captures the rugged and remote characteristics.

### **Big Blue Creek (G-13)**

*Location:* Gunnison District, Gunnison County. This one-mile river segment is located directly west of Big Blue Campground and the Alpine Ranger Station. T.46N., R.05W., Sections 13 and 24 (figure 11).



**Figure 11. Eligible wild and scenic river segments for Big Blue Creek**

Total length (miles): 1.0

Eligible length on National Forest System lands (miles): 1.0

Eligible corridor area on National Forest System lands (acres): 390

Preliminary classification: Scenic

Outstandingly remarkable value: Historic/Cultural

#### *Description of Outstandingly Remarkable Value*

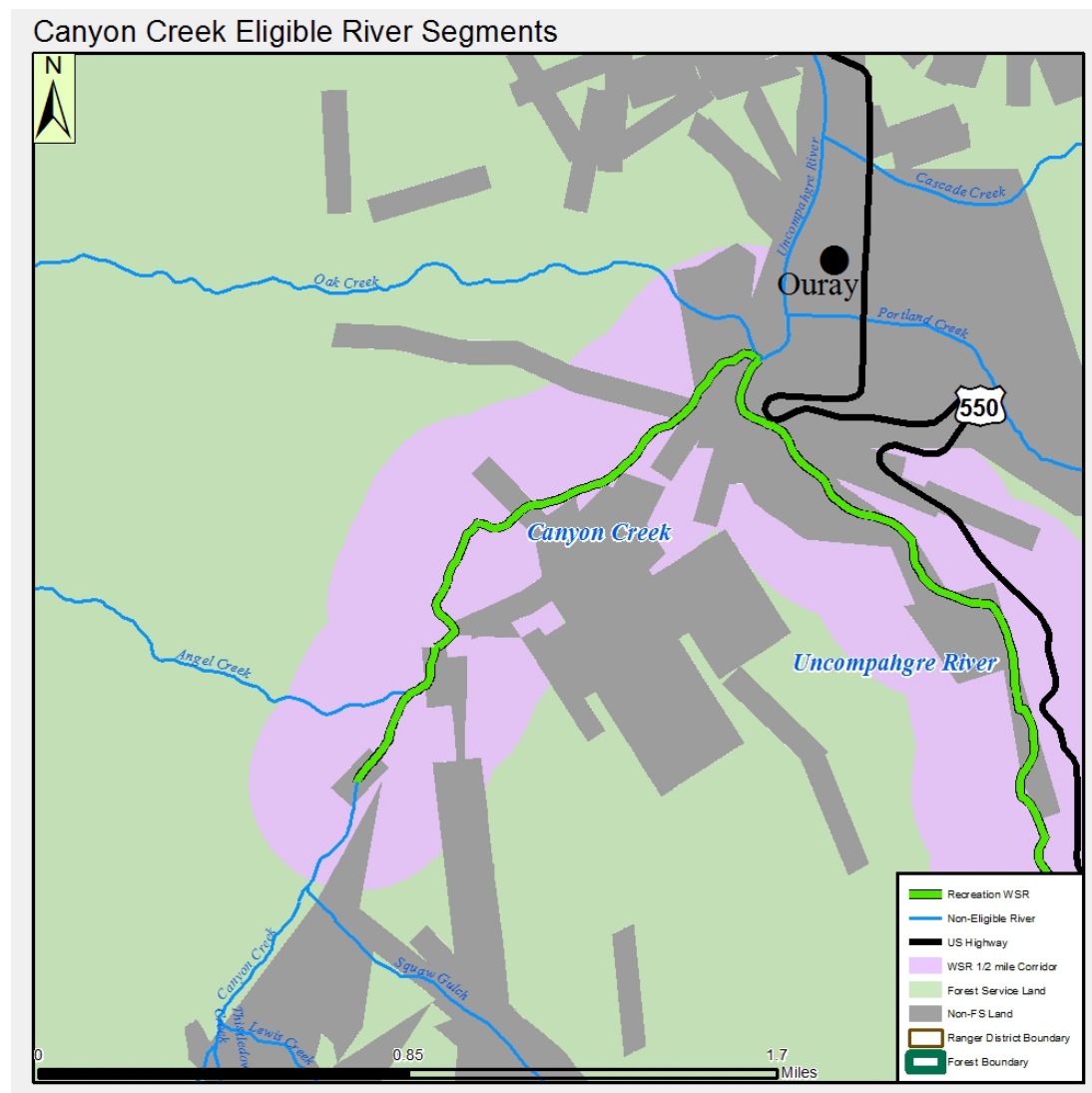
The Alpine Ranger station is located in close proximity to Big Blue Creek just north of the Uncompahgre Wilderness boundary. The original Ranger Station was constructed in 1907 and is the second oldest Ranger Station still in operation in the United States. The second structure was added in 1920 and the entire complex has recently been rehabilitated.

### *Rationale for Preliminary Classification*

The segment of Big Blue Creek eligible for inclusion in the National Wild and Scenic Rivers System is not located within designated wilderness but is free of impoundments. One system road provides access close to this area and its banks are largely primitive, with the exception of Big Blue Campground. Although grazing is permitted in the area, there is no evidence of timber harvest from the riverbanks. The preliminary classification is therefore scenic.

### **Canyon Creek (O-2)**

*Location:* Ouray District, Ouray County. From approximately the intersection of the 853 Camp Bird Road and 896 Cutler Mine Road downstream to the confluence of the Uncompahgre River. T.44N., R.08W., Section 36; T.44N., R.07W., Section 31; T.43N., R.08W., Sections 1 and 12 (figure 12).



**Figure 12. Eligible wild and scenic river segments for Canyon Creek**

Total length (miles): 1.5

Eligible length on National Forest System lands (miles): 1.0

Eligible corridor area on National Forest System lands (acres): 370

Preliminary classifications: Recreational

Outstandingly remarkable value: Botany

*Description of Outstandingly Remarkable Value*

This segment of Canyon Creek contains:

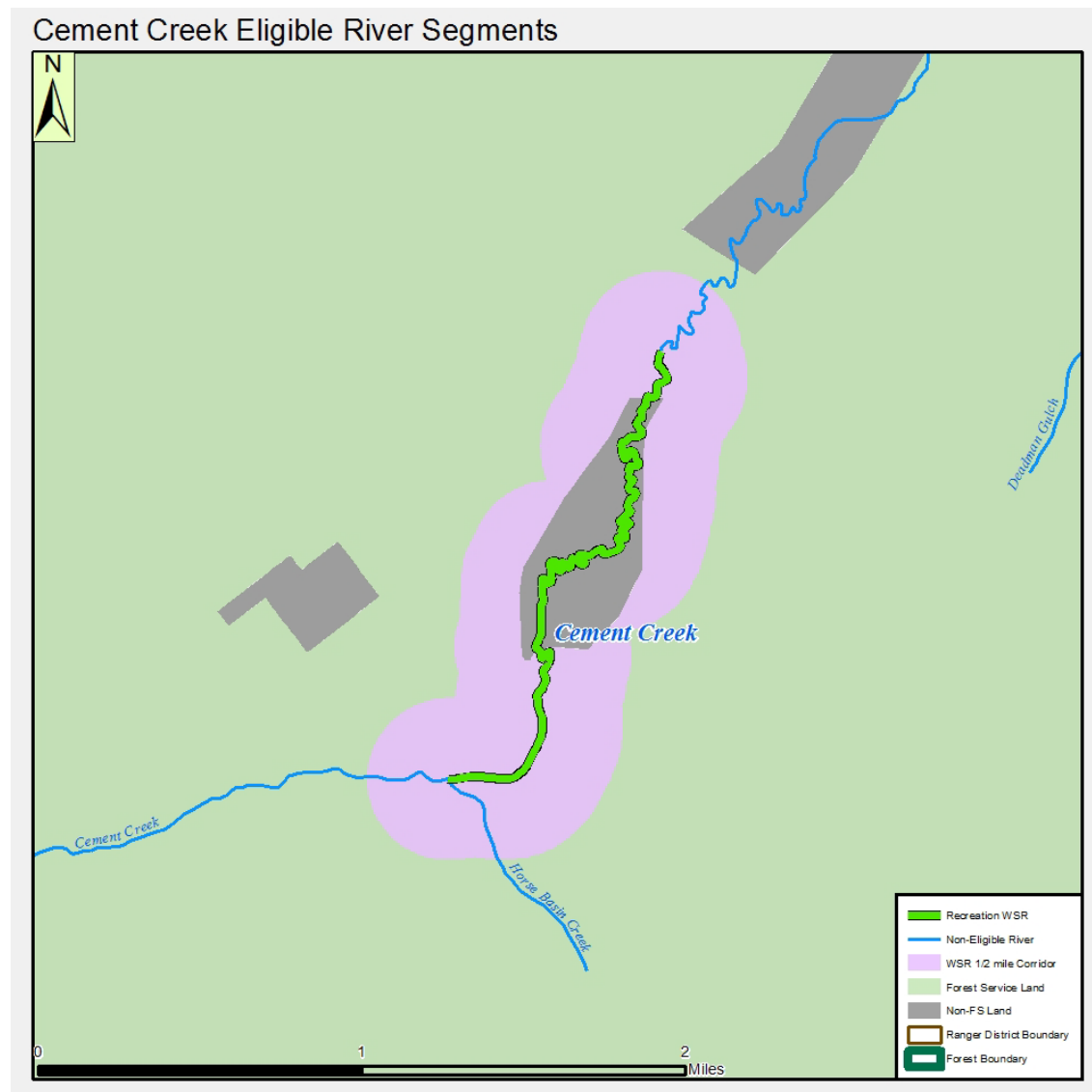
- 1) Rare plant species *Adiantum capillus-veneris*, a type of maidenhair fern, ranked G5, S2 (*Criterion 1: Rare plants identified by the Colorado Natural Heritage Program (CNHP) ranked as G1 or S1 (globally or subnationally ranked critically imperiled) or G2 or S2 (globally or subnationally ranked imperiled), and*
- 2) Natural community types *Pseudotsuga menziesii* / *Acer glabrum* forest (Douglas-fir and Rocky Mountain maple) and *Populus tremuloides* / *Acer glabrum* forest (Quaking aspen and Rocky Mountain maple), ranked as G3/G4 and S2 (*Criterion 2: Community types ranked as G1 or S1 or G2 or S2), and*
- 3) Potential Conservation Area Ouray Canyons, ranked B2 (*Criterion 3: CNHP Potential Conservation Areas with biodiversity significance rankings of B1 (outstanding biodiversity significance) or B2 (very high biodiversity significance).*

*Rationale for Preliminary Classification*

The segment of Canyon Creek eligible for inclusion in the National Wild and Scenic Rivers System is located directly southwest of the popular tourist destination of Ouray. Forest Service Road 853, also known as the Camp Bird Road, parallels this stream segment in its entirety. Multiple private inholdings occur along this segment including the city-owned and operated Box Canyon Falls. The presence of the road along with other substantial evidence of human activity including commercial structures supports a preliminary classification of recreational.

## Cement Creek (G-11)

*Location:* Gunnison District, Gunnison County. From approximately Camp Cement Creek #3 downstream to Cement Creek campground. T.14S., R.84W., Sections 7, 18, 19, and 24 (figure 13).



**Figure 13. Eligible wild and scenic river segments for Cement Creek**

Total length (miles): 2.4

Eligible length on National Forest System lands (miles): 0.9

Eligible corridor area on National Forest System lands (acres): 580

Preliminary classification: Recreational

Outstandingly remarkable value: Botany

### *Description of Outstandingly Remarkable Value*

1) Rare plant species *Trichophorum pumilum* (Little Bulrush/Rolland's Bulrush/Rolland's Leafless Bulrush) ranked G5, S2 and *Carex viridula* (Little Green Sedge), ranked G5, S1 (*Criterion 1: Rare plants*)

identified by the Colorado Natural Heritage Program (CNHP) ranked as G1 or S1 (globally or subnationally ranked critically imperiled) or G2 or S2 (globally or subnationally ranked imperiled), and

2) Natural community type *Kobresia myosuroides*/*Thalictrum alpinum* Fen (Mousetail Bog Sedge/Alpine Meadowrue fen), ranked as G2 and S2 (Criterion 2: Community types ranked as G1 or S1 or G2 or S2), and

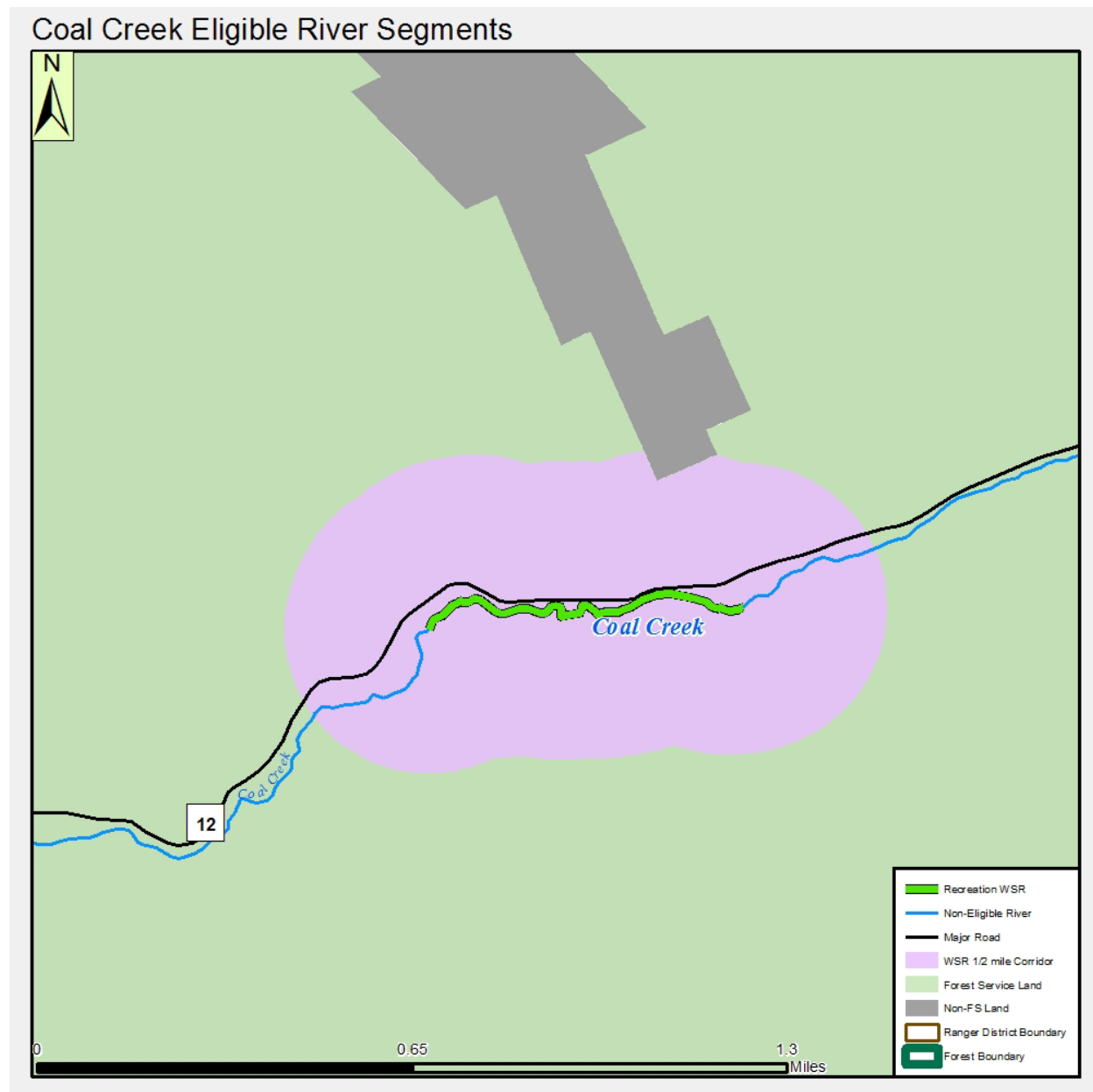
3) Potential Conservation Area Cement Creek, ranked B2 (Criterion 3: CNHP Potential Conservation Areas with biodiversity significance rankings of B1 (outstanding biodiversity significance) or B2 (very high biodiversity significance)).

#### *Rationale for Preliminary Classification*

The segment of Cement Creek eligible for inclusion in the National Wild and Scenic Rivers System is entirely located along Cement Creek Forest Service Road 740. A private ranch with developed hot springs, campground, and frequently traveled road also exist along the banks of much of this river segment. A preliminary classification of recreational was assigned based on the level of development and roads in this popular recreation corridor.

## Coal Creek (G-12)

*Location:* Gunnison District, Gunnison County. South of County Road 12 (Kebler Pass Road) about 3 miles west of the city of Crested Butte, CO. T.14S., R.86W., Sections 5 and 6 (figure 14).



**Figure 14. Eligible wild and scenic river segments for Coal Creek**

Total length (miles): 0.6

Eligible length on National Forest System lands (miles): 0.6

Eligible corridor area on National Forest System lands (acres): 310

Preliminary classification: Recreational

Outstandingly remarkable value: Botany

*Description of Outstandingly Remarkable Value*

- 1) Rare plant species *Drosera rotundifolia* (Round-leafed sundew), ranked G5, S2 (*Criterion 1: Rare plants identified by the Colorado Natural Heritage Program (CNHP) ranked as G1 or S1 (globally or subnationally ranked critically imperiled) or G2 or S2 (globally or subnationally ranked imperiled)*), and
- 2) Natural community type *Betula glandulosa* / *Sphagnum* spp. *Shrub Fen* (American dwarf/resin/shrub birch/Moss/Shrub fen), ranked as G2 and S2 (*Criterion 2: Community types ranked as G1 or S1 or G2 or S2*), and
- 3) Potential Conservation Area Mt. Emmons Iron Fen, ranked B2 (*Criterion 3: CNHP Potential Conservation Areas with biodiversity significance rankings of B1 (outstanding biodiversity significance) or B2 (very high biodiversity significance)*).

*Rationale for Preliminary Classification*

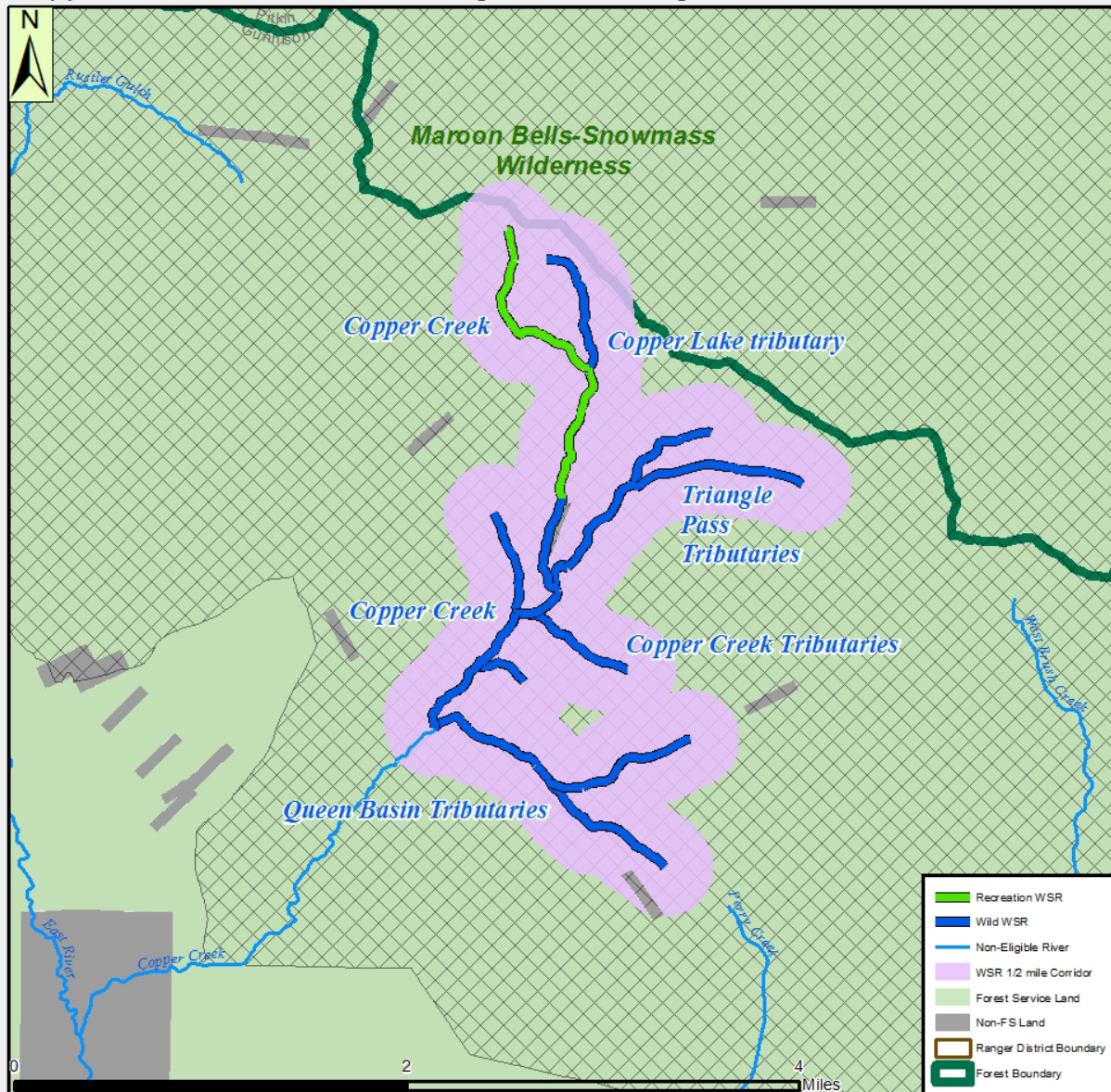
The segment of Coal Creek eligible for inclusion in the National Wild and Scenic Rivers System is entirely located along county road 12 (Kebler Pass Road). This segment is located along a highly traveled county road popular with tourists and locals which continues throughout the winter with snowmobile traffic. A preliminary classification of recreational was assigned based on the level of developments and roads in this popular recreation corridor.



### Copper Lake, Copper Creek and Tributaries (G-9A to G-9D)

*Location:* Gunnison District, Gunnison County. From the headwaters at the base of the Elk Mountain range in the southern portion of the Maroon Bells-Snowmass Wilderness to the confluence of the main stem and Queen Basin tributaries. The headwaters begin south of the GMUG's shared boundary with the White River National Forest. T.12S., R.86W., Sections 13, 24, 25, 26, and 36; T.12S., R.85W. Sections 19 and 30 (figure 15).

Copper Creek and Tributaries Eligible River Segments



**Figure 15. Eligible wild and scenic river segments for Copper Lake, Copper Creek, and tributaries**

Total length (miles): 10.0

Eligible length on National Forest System lands (miles): 9.7

Eligible corridor area on National Forest System lands (acres): 2,530

Preliminary classifications: Wild; recreational.

Outstandingly remarkable value: Wildlife

*Description of Outstandingly Remarkable Value*

The Triangle Pass tributaries (G-9B) contain what may be the last population of chytrid-free boreal toad (in 2023 renamed the western toad) in the Gunnison Basin. This is used as a source for brood stock to support reintroduction efforts and population supplementation elsewhere in the region. Toads may use areas within 1.6 miles of a breeding pond or site, which is represented by the other tributaries identified as eligible. This habitat provides an outstanding resource value for this important population of a rare and declining species that is listed by the State of Colorado as endangered, and is a species identified by the regional forester as a Species of Conservation Concern in the GMUG at the time of the forest plan decision.

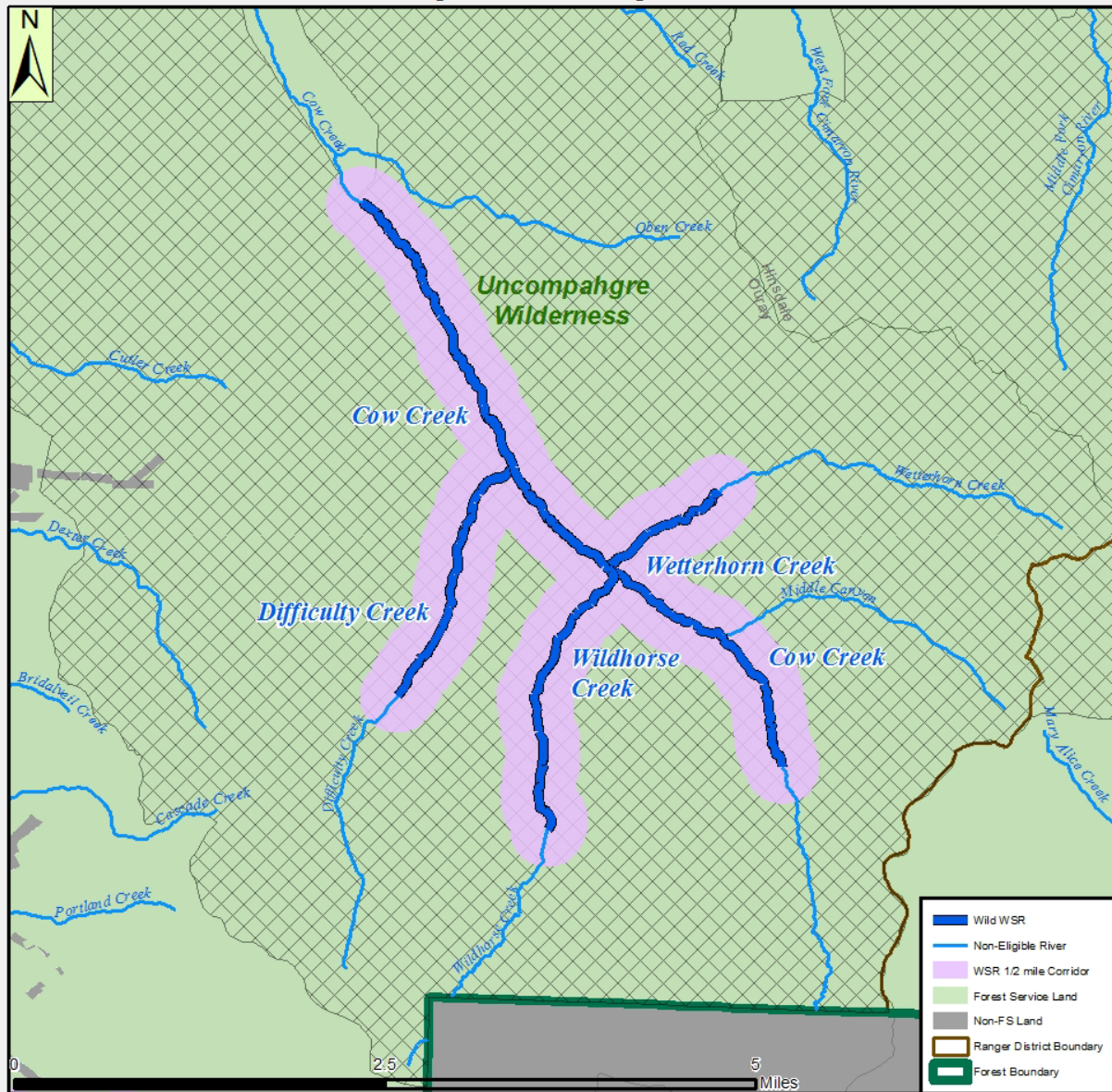
*Rationale for Preliminary Classification:* On the main stem of Copper Creek, aerial imagery indicates a reservoir near the headwaters, and Forest Service GIS data includes a named pond, so the preliminary classification of this segment is recreational due to presence of impoundments and/or diversions, despite its location within congressionally designated wilderness. Copper Lake and the other various tributaries are preliminarily classified as wild. The area is generally inaccessible, except by trail, and is located within the Maroon Bells-Snowmass Wilderness area.



## Cow Creek and Tributaries (O-1A – O-1D)

*Location:* Ouray District, Ouray County. From the headwaters at the base of Blackwall Mountain in the southern portion of the Uncompahgre Wilderness downstream (north northwest) to within 0.1 mile of the wilderness boundary. T.44N., R.6W., Sections 18, 19, 29 and 30; T.44S., R.7W. Sections 2, 11, 13, 14, 23, 24, and 25 (figure 16).

**Cow Creek and Tributaries Eligible River Segments**



**Figure 16. Eligible wild and scenic river segments for Cow Creek and tributaries**

Total length (miles): 10.1

Eligible length in the national forests (miles): 10.1

Total corridor area (acres): 3,190

Eligible corridor area (acres): 3,190

Preliminary classification: Wild

Outstandingly remarkable values: Scenery

*Description of Outstandingly Remarkable Value*

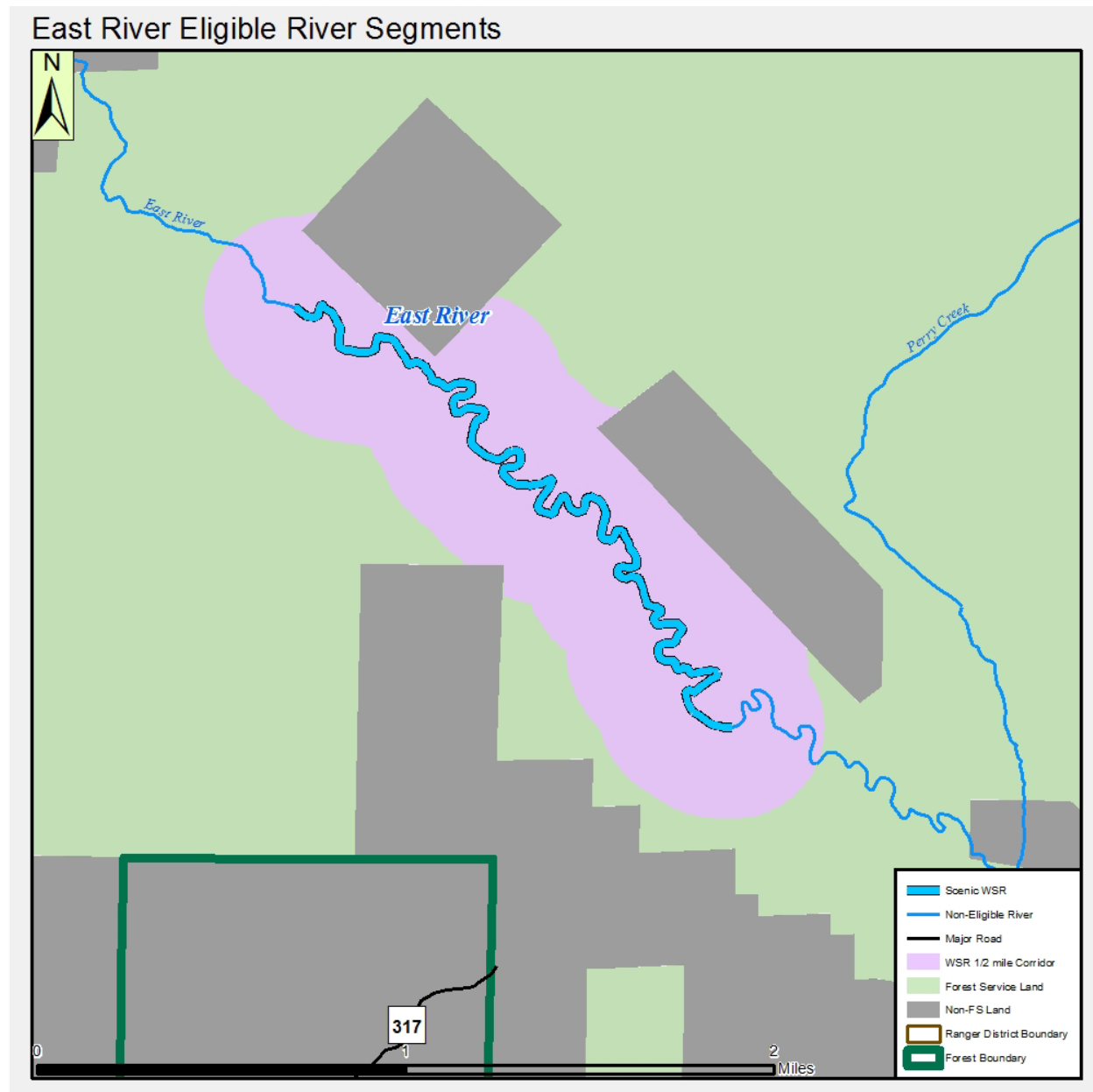
Cow Creek offers outstanding scenery due to its steep, narrow canyon. Much of the upper portion of the watershed is inaccessible due to steep canyon walls. The depth of the canyon walls along the creek average 1,400 feet on both sides. Large waterfalls and unique geologic formation give this creek its scenic nature. Cow Creek offers a primitive experience due to its inaccessibility and lack of trails. Tributaries to Cow Creek – Wetterhorn, Wildhorse, and Difficulty – offer outstanding scenery and wildness due to their steep, narrow canyons. Much of the lower portion of the watershed is inaccessible due to steep canyon walls. The upper portion of the watershed opens into a large meadow that offers expansive views of geologic formations in Wetterhorn Creek and the surrounding area and of nearby peaks in the Uncompahgre Wilderness.

*Rationale for Preliminary Classification*

Cow Creek and select tributaries are preliminarily classified as wild. The area is generally inaccessible, except by trail, and is located within the congressionally designated Uncompahgre Wilderness. There are no impoundments or developments, and the water quality is unimpaired.

### East River (G-15)

*Location:* Gunnison District, Gunnison County. This eligible river segment is located directly north of Crested Butte Mountain Resort. It begins about 1.5 miles directly northwest of the Mt. Crested Butte Water and Sanitation District Pumphouse and extends downstream to the pumphouse facility. T.13S., R.86W., Sections 11, 12, 13, and 14 (figure 17).



**Figure 17. Eligible wild and scenic river segments for East River**

Total length (miles): 3.0

Eligible length on National Forest System lands (miles): 3.0

Eligible corridor area on National Forest System lands (acres): 660

Preliminary classification: Scenic

Outstandingly remarkable value: Geology

*Description of Outstandingly Remarkable Value*

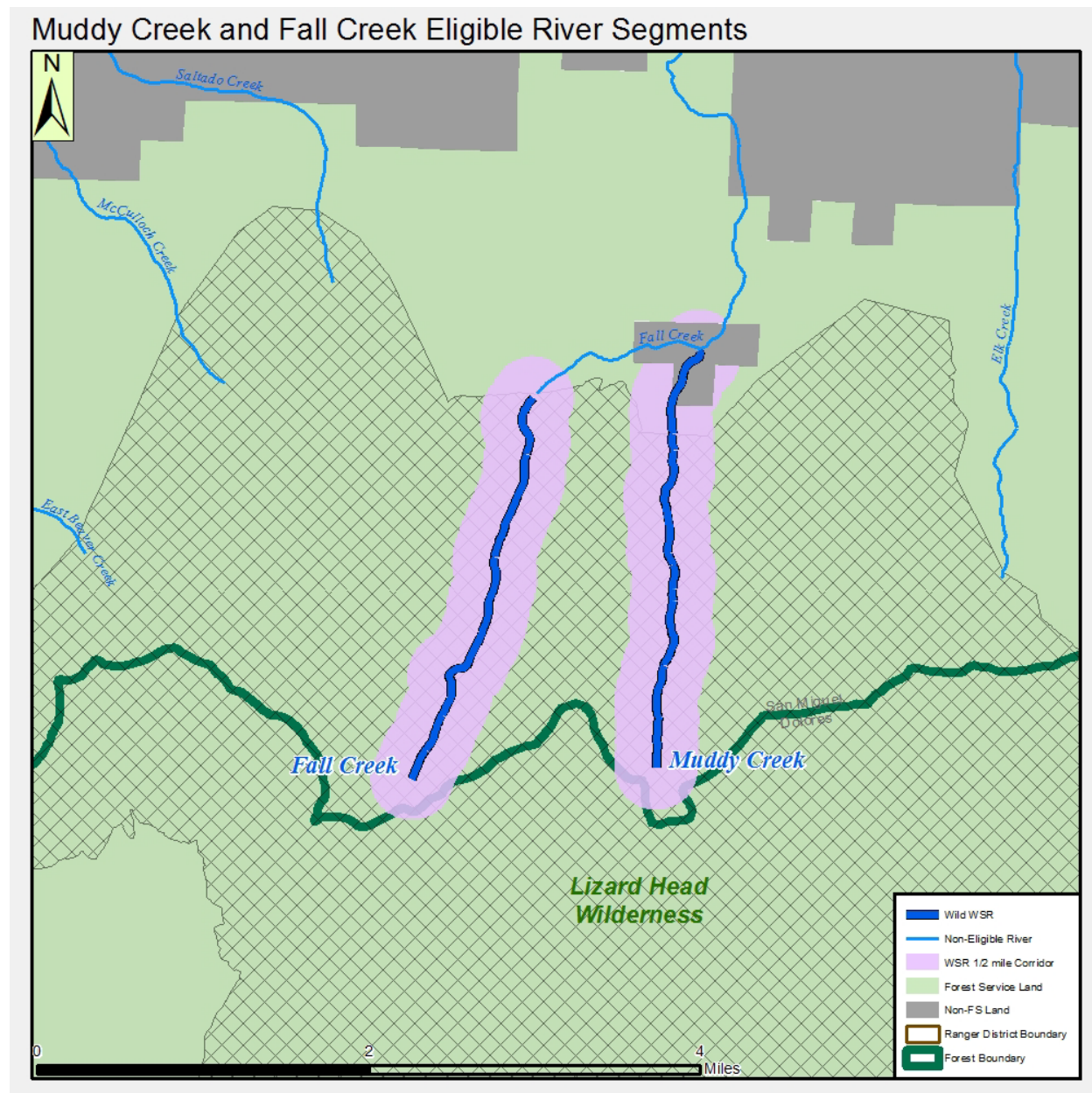
This eligible segment of East River is a textbook example of a subalpine meandering fluvial system in Colorado and throughout the Rocky Mountain Region. Exemplary representative geomorphic elements formed within this stream corridor include the presence of a single, highly sinuous main river channel; numerous meander loops with well-developed point bars and cutbanks along the course of the river; existing and infilled oxbow lakes and meander scars across the floodplain; and a relatively wide floodplain consisting largely of unconsolidated, surficial fluvial deposits.

*Rationale for Preliminary Classification*

The segment of East River eligible for inclusion in the National Wild and Scenic Rivers System is not located within any designated wilderness but is free of impoundments. It is largely undeveloped but can be accessed by at least one road and the pumphouse structure is located along its banks. These factors contributed to a preliminary classification of scenic.



## Fall Creek and Muddy Creek



**Figure 18. Eligible wild and scenic river segments for Fall Creek and Muddy Creek**

### Fall Creek (N-1)

*Location:* Norwood District, San Miguel County. From the headwaters at the base of the San Miguel Mountain range (Dolores Peak) in the Lizard Head Wilderness downstream (north) to the wilderness boundary. The headwaters begin in the GMUG, south of the shared boundary with the San Juan National Forest. T.41S., R.11W., Sections 27, 33, and 34; T.42S., R.11W., Section 4 (Figure 18).

Total length (Fall Creek) (miles): 2.5

Eligible length (Fall Creek) on National Forest System lands (miles): 2.5

Eligible corridor area (Fall Creek) on National Forest System lands (acres): 910

Preliminary classification (Fall Creek): Wild

Outstandingly remarkable value (Fall Creek): Fish

*Description of Outstandingly Remarkable Value*

Fall Creek contains a unique and important Colorado River green-lineage cutthroat trout conservation population used by Colorado Parks and Wildlife for brood stock. Fall Creek provides excellent habitat for this population of cutthroat trout to remain intact.

*Rationale for Preliminary Classification*

The segment of Fall Creek eligible for inclusion in the National Wild and Scenic Rivers System is entirely located within the Lizard Head Wilderness and is free of impoundments. No system road or trail provides access to this area and its banks are primitive. Therefore, the preliminary classification is wild.

**Muddy Creek (N-2)**

*Location:* Norwood District, San Miguel County. From the headwaters about 1.6 miles west-southwest of Boskoff Peak downstream (north) to the confluence with Fall Creek. T.41N., R.11W., Section 2; T.42N., R.11W., Sections 23, 26, and 35 (Figure 18.).

Total length (miles): 2.7

Eligible length on National Forest System lands (miles): 2.3

Eligible corridor area on National Forest System lands (acres): 830

Preliminary classification: Wild

Outstandingly remarkable value: Fish

*Description of Outstandingly Remarkable Value*

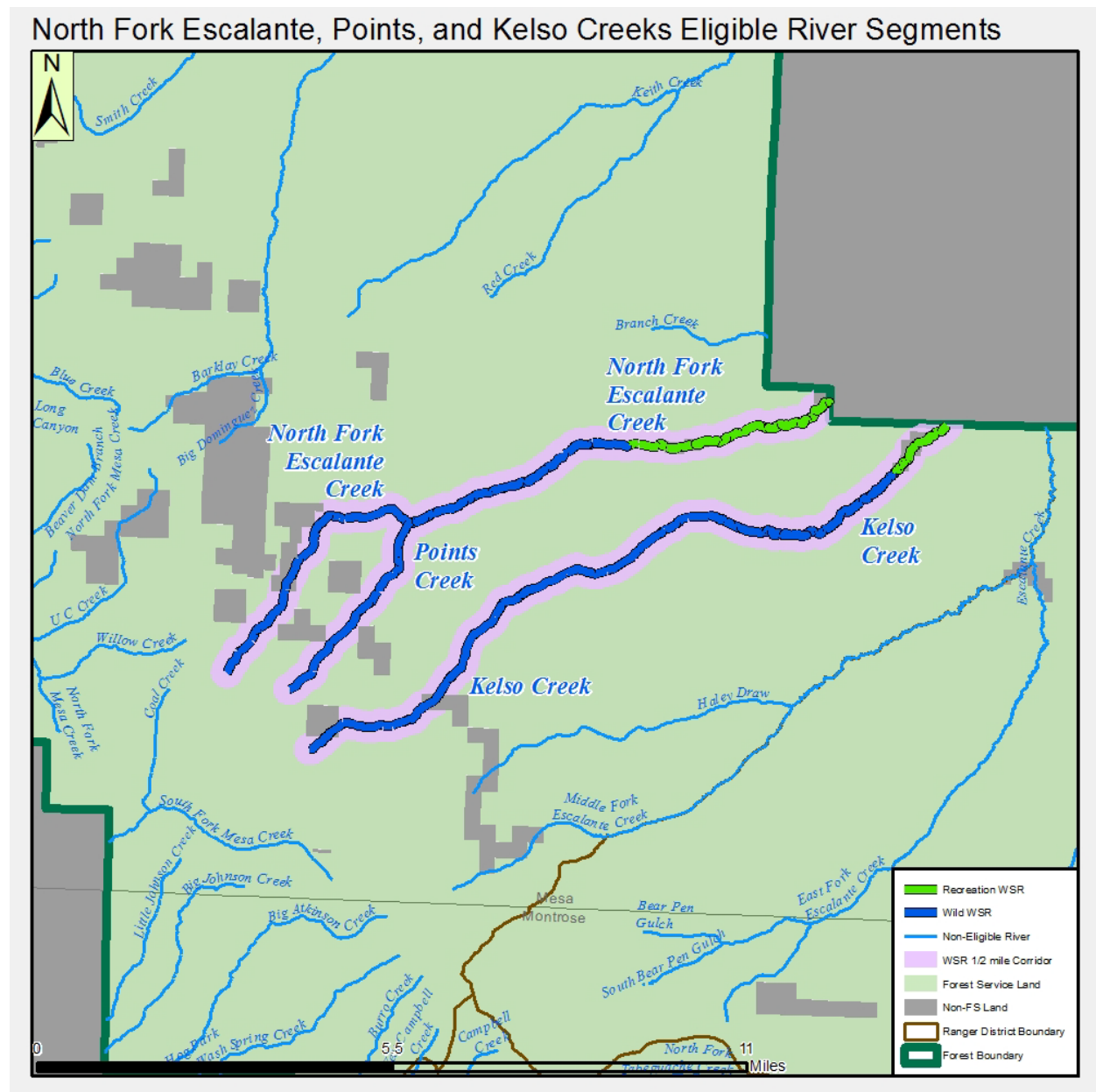
This segment supports a conservation population of Colorado River green-lineage cutthroat trout, which Colorado Parks and Wildlife uses as broodstock. The pristine condition of the headwaters for fish habitat and uniqueness of this fish population warrant its status as eligible for Wild and Scenic.

*Rationale for Preliminary Classification*

The segment of Muddy Creek can only be accessed by trail. The northern portion of the eligible corridor is privately owned with road access, but the segment can be reached only by hiking off trail. There are no diversions or impoundments in this segment of Muddy Creek, thereby qualifying this segment as for preliminary classification as wild.



## Kelso, North Fork Escalante and Points Creeks



**Figure 19. Eligible wild and scenic river segments for North Fork Escalante Creek, Points Creek, and Kelso Creek**

### Kelso Creek (GV-3)

**Location:** Grand Valley District, Mesa County. From the headwaters of the east side of the Uncompahgre Plateau, downstream (east-northeast) to the national forest boundary. T.49S., R.16W., Section 1; T.49S., R.15W., Sections 5 and 6; T.50S., R.15W., Sections 22, 23, 24, 27, 28, 29, and 32; T.50S., R.14W., Sections 9, 16, 17, 19, and 20 (figure 19).

Total length (miles): 13.2

Eligible length on National Forest System lands (miles): 11.9

Eligible corridor area on National Forest System lands (acres): 3,750

Preliminary Classifications: Wild, recreation

Outstandingly remarkable value: Fish

*Description of Outstandingly Remarkable Value*

The population of Colorado River green-lineage cutthroat trout in these segments is unique as it is the most genetically pure population currently known (greater than 90 percent purity). Combined with North Fork Escalante and Points Creeks, there are several miles of contiguous, high-quality habitat that do not occur elsewhere for the species. The quality of habitat on these segments are unrivaled in the GMUG.

*Rationale for Preliminary Classification*

The upstream section of Kelso Creek is free of impoundments and diversions, is only accessible by trail, and its shorelines are primitive, so it is therefore preliminarily classified as wild. The downstream section of Kelso Creek begins at a private land inholding and can be accessed by road. There is also a diversion at the upstream end of this portion, so it is preliminarily classified as recreational.

**North Fork Escalante Creek (GV-1)**

Location: Grand Valley District, Mesa County. From the headwaters about 0.1 mile north of Divide Road (402) downstream (north-northeast) to the national forest boundary. T.50N., R.16W., Sections 23, 24, 26, 34, and 35; T.50N., R.15W., Sections 10, 11, 12, 14, 15, 16, 17, 19, and 20; T.50N., R.14W., Section 7 (figure 19).

Total length (miles): 12.6

Eligible length on National Forest System lands (miles): 11.4

Eligible corridor area on National Forest System lands (acres): 3,500

Preliminary classifications: Wild, recreational

Outstandingly remarkable value: Fish

*Description of Outstandingly Remarkable Value*

The population of Colorado River green-lineage cutthroat trout in North Fork Escalante Creek is unique, with greater than 90 percent genetic purity. Combined with Kelso and Points Creeks, these eligible segments comprise almost thirty miles of contiguous, high-quality habitat. This trout habitat is unrivaled in the GMUG.

*Rationale for Preliminary Classification*

North Fork Escalante Creek flows mostly through steep canyon and can be accessed only by trail. Segment A (upper section) is free of impoundments and diversions and its banks are undeveloped and primitive; therefore, it is classified as wild. Segment B (lower section) is also remote and inaccessible by road but diversions along its length are the reason for recreational classification. The Short Point non-motorized trail runs along the creek.

**Points Creek (GV-2)**

Location: Grand Valley District, Mesa County. From the headwaters about 0.1 mile east of the Junction of Divide Rd (402) and Long Point Rd (421) to the confluence with North Fork Escalante Creek. T.49N.,

R.16W., Section 2; T.50N., R.16W., Sections 25, 35, and 36; T.50N., R.15W., Sections 19 and 30 (figure 19).

Total eligible length (miles): 3.4

Eligible length on National Forest System lands (miles): 3.4

Eligible corridor area on National Forest System lands (acres): 1,170

Preliminary classification: Wild

Outstandingly remarkable value: Fish

*Description of Outstandingly Remarkable Value*

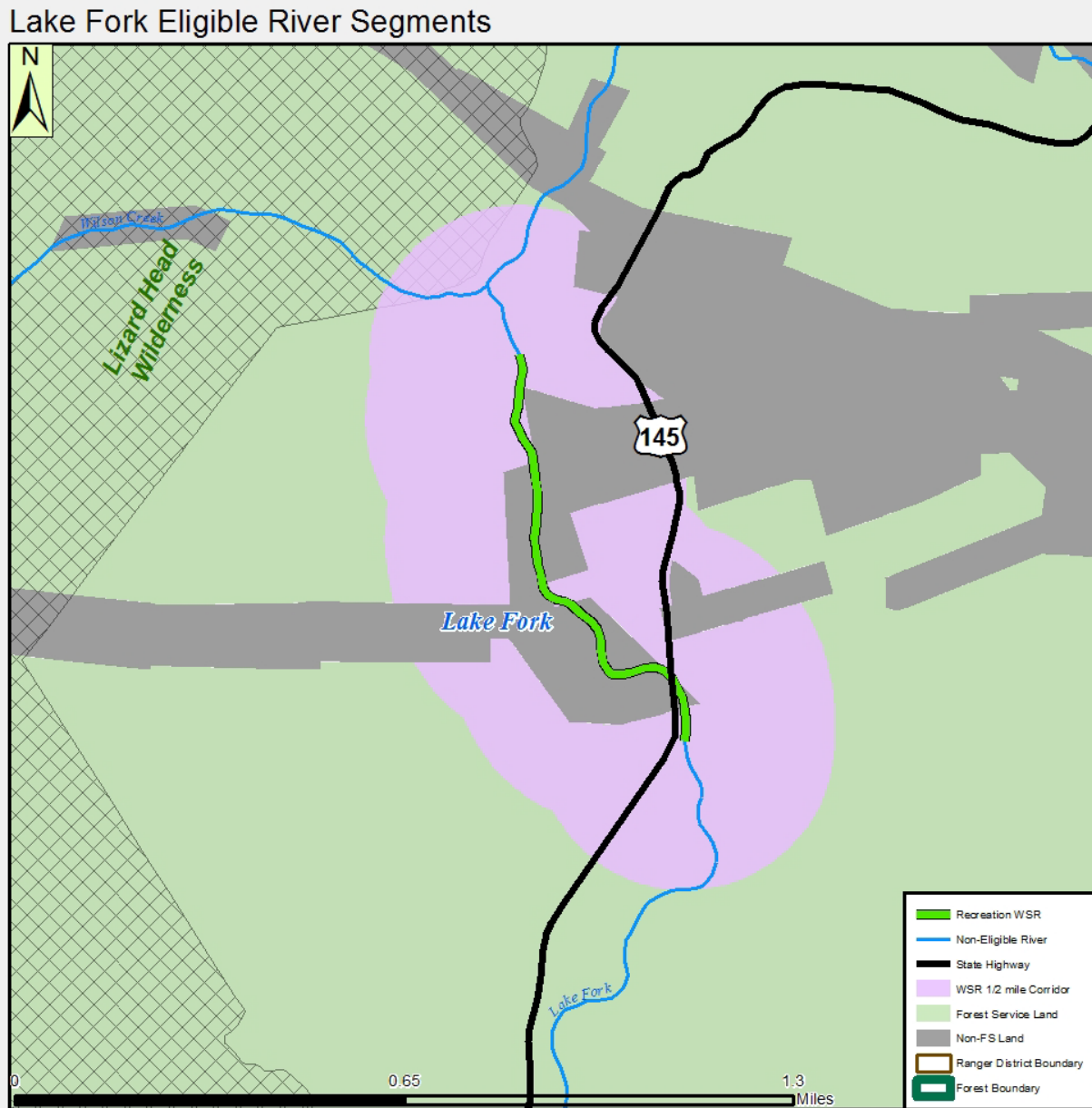
The population of Colorado River green-lineage cutthroat trout is unique, with greater than 90 genetic percent purity. Combined with North Fork Escalante and Kelso Creeks, these segments comprise 30 miles of contiguous, high-quality habitat unrivaled in the GMUG.

*Rationale for Preliminary Classification*

Points Creek is a tributary to North Fork Escalante Creek and cannot be accessed by road. The confluence can be reached by the Short Point Trail, but most of its length is remote and surrounded by steep canyon cliffs. It is free of impoundments and therefore preliminarily classified as wild.

### Lake Fork San Miguel (N-7)

*Location:* Norwood District, San Miguel County. Beginning near the Priest Lake Nordic ski area along Hwy 145 flowing north through a residential neighborhood ending on Forest Service lands. T.42N., R.09W., Section 32; T.41N., R.09W., Section 5 (figure 20).



**Figure 20. Eligible wild and scenic river segments for Lake Fork San Miguel River**

Total length (miles): 0.8

Eligible length on National Forest System lands (miles): 0.3

Eligible corridor area on National Forest System lands (acres): 270

Preliminary classification: Recreational

Outstandingly remarkable value: Cultural/Historical

*Description of Outstandingly Remarkable Value*

Matterhorn mill on the Lake Fork of the San Miguel River is a Priority Heritage Asset site with a railroad spur off the Rio Grande Southern Railroad. The abandoned mill is standing onsite much as it appeared when first built in 1920. The site has had few significant intrusions which would diminish the historical archaeology potential it contains. The location of the mill is directly related to the presence of the river.

*Rationale for Preliminary Classification*

The segment of the Lake Fork of the San Miguel River eligible for inclusion in the National Wild and Scenic Rivers System is entirely located along a major state highway and flows through a residential neighborhood. Evidence of human impacts including roads and residences factor into the preliminary classification of recreational.



Outstandingly remarkable value: Recreation

*Description of Outstandingly Remarkable Value*

Whitewater rafting and kayaking opportunities range from Class II – V on the Lower Taylor River, providing a high-quality whitewater experience. Abundant fishing opportunities ranging from shore, wade, or float fishing are available along this segment, and Colorado Parks and Wildlife identified this segment as a Gold Medal fishery in 2023, which is a designation for high-value recreational fisheries. A gold medal water is defined as being able to produce 60 pounds of trout per acre, and at least twelve 14" or larger trout per acre (CPW). Multiple developed access points and boat ramps along the highway with a picturesque rocky mountain canyon provide accessible, high-quality river experiences.

The Lower Taylor River corridor is also heavily used by road bikers and scenic drivers seeking views of the river and its riparian surroundings. Numerous pullouts along the Lower Taylor facilitate scenic driving, picnicking, and biking. The Lower Taylor River draws people from around the region and country to enjoy its many river-related activities. Two whitewater rafting companies provide approximately 14,000 service days while two smaller companies offer kayaking and class I-II trips. Other guided activities that attract clients from around the country for numerous companies include wade fishing and float fishing, which is in high demand.

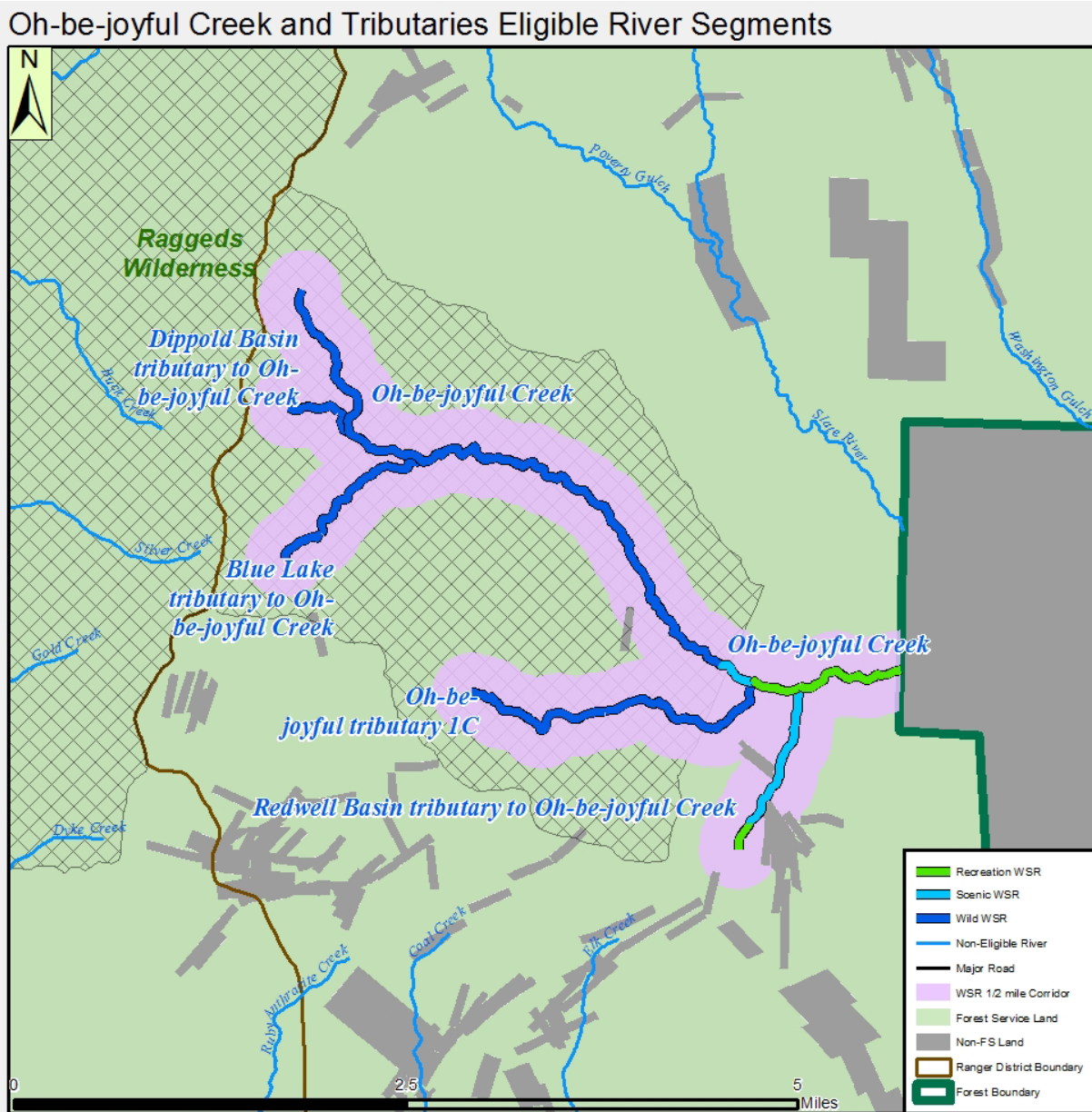
*Rationale for Preliminary Classification*

The segment of the Lower Taylor River eligible for inclusion in the National Wild and Scenic Rivers System is paralleled entirely by road 742. Development within this river corridor includes nine developed campgrounds, three developed boat ramps and numerous informal launch sites. This paved road is frequently traveled especially in the summer as it accesses popular destinations beyond the river itself. These factors contributed to a preliminary classification of recreational.



### Oh-Be-Joyful Creek and Tributaries (G-1 to G-1D)

*Location:* Gunnison District, Gunnison County. From the headwaters of Dippold, Blue Lake Redwell and Peeler basins to the boundary of National Forest System and Bureau of Land Management lands. T.13S., R.86W., Sections 19 and 30. T.13S., R.87W., Sections 10, 13, 14, 15, 16, 21, 22, 23, 24, 25, and 26 (figure 22).



**Figure 22. Eligible wild and scenic river segments for Oh-Be-Joyful Creek and tributaries**

Total eligible length (miles): 11.1

Eligible length on National Forest System lands (miles): 11.1

Total eligible corridor area (acres): 3,260

Eligible corridor area (acres): 3,140



Preliminary classifications: Wild, Scenic, and recreational

Outstandingly remarkable values: Scenery, Botany (Redwell Basin Tributary)

*Description of Outstandingly Remarkable Values*

The first group of eligible stream segments, including the upper segment of Oh-Be-Joyful Creek (the G1 portion classified as wild), along with Blue Lake and Dippold Basin tributaries (G-1A and G-1B), features hanging vegetation gardens as well as outstanding views of the Ruby Range from within the river corridor. These segments have waterfalls, lakes, and tarns, , high alpine flower-filled basins, and steep canyons, each continuing to be shaped by the creek and tributaries. Approximately 8 miles of primitive foot and horse trails, including Daisy Pass and Oh-Be-Joyful Pass trails, lie within the stream corridors.

Flowing from the Raggeds Wilderness boundary to the forest boundary, the lower segment of Oh-Be-Joyful Creek (the lower portion of G1 classified as recreational) provides excellent opportunities for extreme kayaking, with a series of 18- to 25-foot waterfalls that are unique features on the Western Slope, drawing kayakers from across the region and state during spring runoff.

The Peeler Basin tributary (G-1C) features outstanding scenery influenced by the creek: a wildflower-filled setting that includes the three Peeler Lakes, a large waterfall and steep canyon below the lakes, and the high-alpine, cirque-like setting of the tributary.

The Redwell Basin tributary (G-1D) features outstanding scenery influenced by the creek; a wildflower-filled setting, and the high-alpine, cirque-like setting of the tributary. A unique and rare iron fen along this tributary is the botanical ORV. The botany features include:

- 1) Rare plant species *Listera borealis* (Northern twayblade orchid), ranked G5, S2 (*Criterion 1: Rare plants identified by the Colorado Natural Heritage Program (CNHP) ranked as G1 or S1 (globally or subnationally ranked critically imperiled) or G2 or S2 (globally or subnationally ranked imperiled)*), and
- 2) Natural community type *Betula glandulosa* / *Sphagnum* spp. *Shrub Fen* (American dwarf/resin/shrub birch/Moss/Shrub fen), ranked as G2 and S2 (*Criterion 2: Community types ranked as G1 or S1 or G2 or S2*), and
- 3) Potential Conservation Area Redwell Basin Iron Fen, ranked B2 (*Criterion 3: CNHP Potential Conservation Areas with biodiversity significance rankings of B1 (outstanding biodiversity significance) or B2 (very high biodiversity significance)*).

*Rationale for Preliminary Classification*

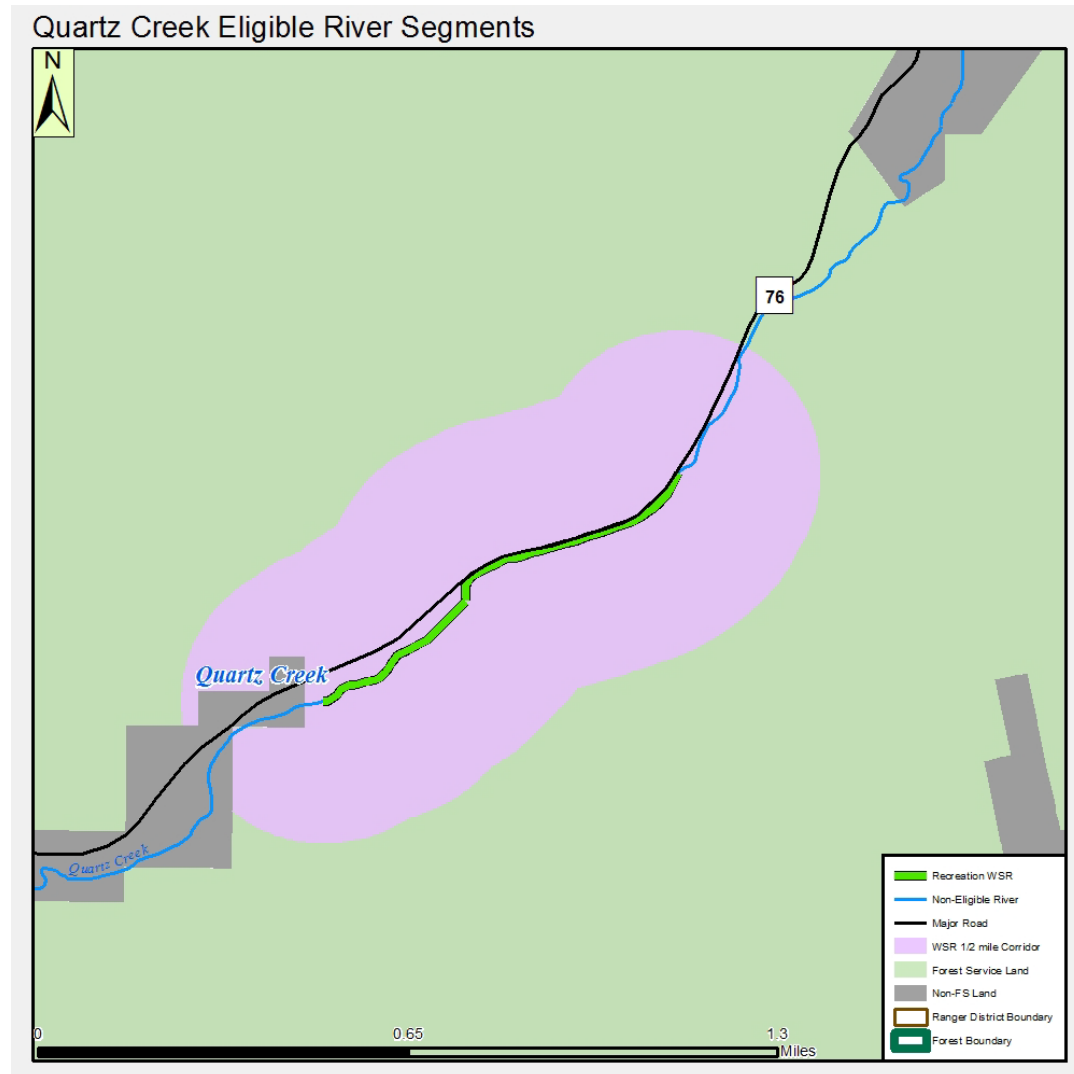
Blue Lake tributary, Dippold Basin tributary, upper Oh-Be-Joyful Creek, and Peeler Basin tributary (upper G-1, G-1A, G-1B, and G-1C) are free of impoundments and diversion and can only be accessed by trail. Their watersheds are pristine and undeveloped and are therefore preliminarily classified as wild.

The lowest segment of Oh-Be-Joyful Creek (lower G-1) can be accessed by a rugged four-wheel drive, high-clearance road and this portion is classified as recreational as a result. Beyond the end of the road upstream to the wilderness boundary, the river is not readily accessible by road and a classification of scenic is appropriate. Both sections are listed by the State of Colorado as 303D water quality-impaired as of 2022, with elevated levels of cadmium and zinc.

The Redwell Basin tributary (G-1D) can be accessed by a rugged four-wheel drive high clearance road. The presence of roads crossing through the stream and mine shafts is evidence of substantial human activity and the main factor contributing to the recreational classification of the uppermost portion of the Redwell Basin tributary. Downstream to the confluence with the main stem of Oh-Be-Joyful, the area is not readily accessible by road, but the scenic classification is appropriate as this tributary is also listed by the State of Colorado as 303D water quality-impaired as of 2022, with elevated levels of cadmium and zinc.

### Quartz Creek (G-14)

*Location:* Gunnison District, Gunnison County. The Quartz Creek segment begins and ends within one half mile of the Roosevelt Mine spur road 7488.1. This segment is located between the towns of Ohio City and Pitkin. T.50N., R.4E., Sections 19 and 20 (figure 23).



**Figure 23. Eligible wild and scenic river segments for Quartz Creek**

Total eligible length (miles): 0.8

Eligible length on National Forest System lands (miles): 0.8

Eligible corridor area on National Forest System lands (acres): 360

Preliminary classification: Recreational

Outstandingly remarkable values: Historical/Cultural

#### *Description of Outstandingly Remarkable Value*

The Roosevelt Mine, Mill and Powerplant complex is located along Quartz Creek downstream from the town of Pitkin. The mine and mill were operated at the turn of the 20<sup>th</sup> century and continued through World War II. The entire feature was dependent on the flowing waters of Quartz Creek. The river was

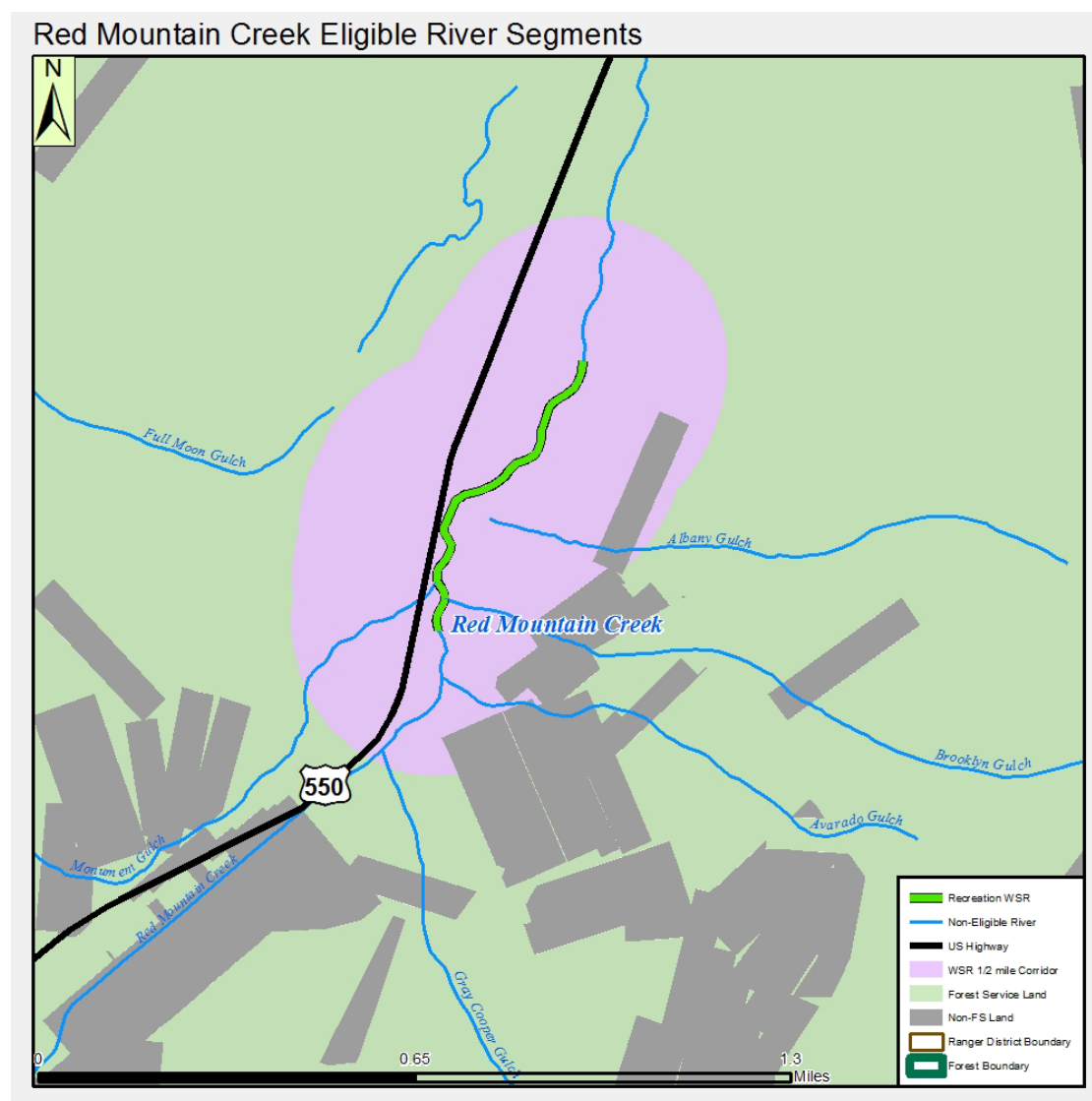
diverted through wooden stave pipes secured with iron rings along the creek for over a mile to the power plant. The power generated was then used at the only standing stamp mill in the Gunnison National Forest.

#### *Rationale for Preliminary Classification*

Quartz Creek is preliminarily classified as recreational. This entire section can be reached by the 76 road that parallels the full 0.8-mile length. The presence of the road and neighboring ranches and primitive developments contributed to the preliminary classification.

### **Red Mountain Creek (O-5)**

*Location:* Ouray District, Ouray County. This segment is located along state highway 550 at the base of Brown Mountain near the Ironton Townsite. T.43N., R.7W., Sections 29 and 32 (figure 24).



**Figure 24. Eligible wild and scenic river segments for Red Mountain Creek**

Total eligible length (miles): 0.6

Eligible length on National Forest System lands (miles): 0.6

Eligible corridor area on National Forest System lands (acres): 280

Preliminary classification: Recreational

Outstandingly remarkable value: Cultural/Historical

*Description of Outstandingly Remarkable Value*

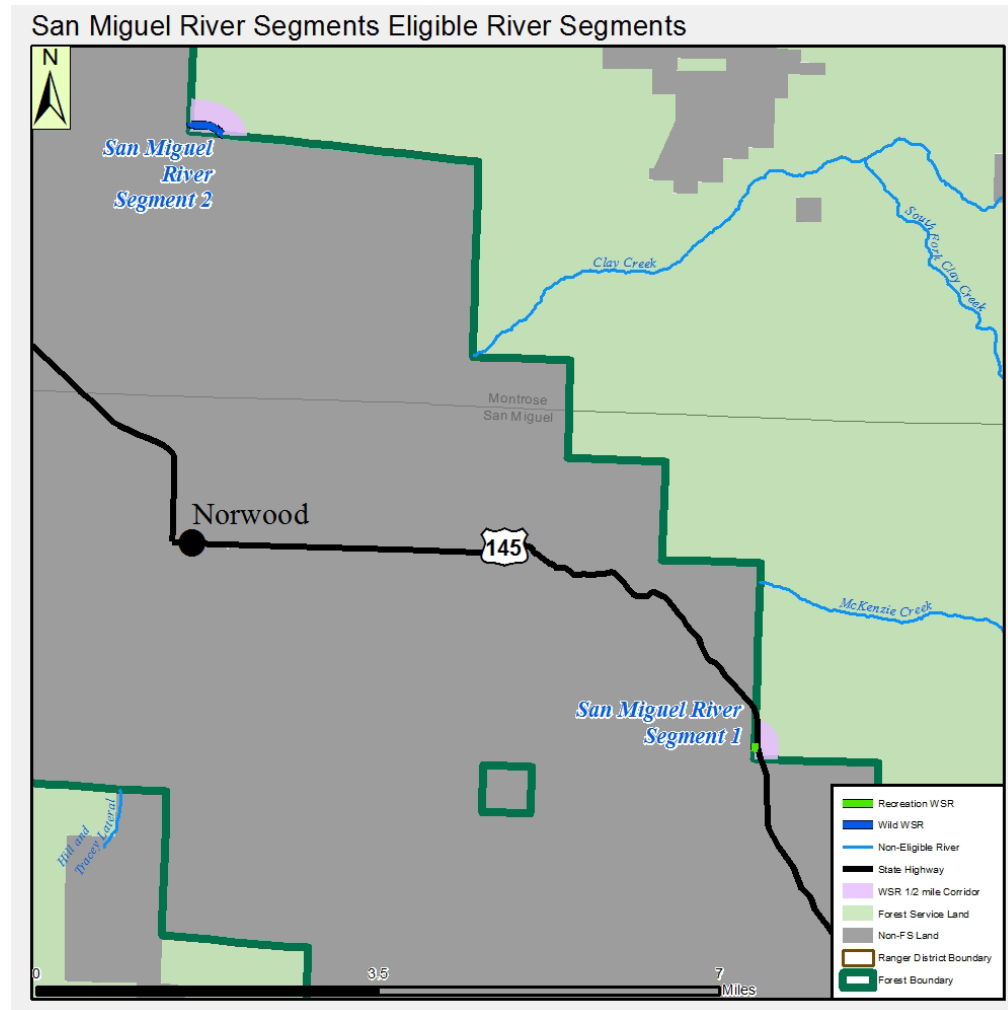
The Saratoga smelter lies at the north end of the Red Mountain Mining District in Iron Mountain Park. This smelter, which is now in ruins, was the northern terminus of the Silverton Railroad, and was dependent on the water of Red Mountain Creek.

*Rationale for Preliminary Classification*

The segment of Red Mountain Creek eligible for inclusion in the National Wild and Scenic Rivers System is entirely located alongside state highway 550. Numerous developments and the presence of the state highway contribute to a preliminary classification of recreational.

## San Miguel River (N-5 and N-6)

*Location:* Norwood District, Montrose and San Miguel Counties. In San Miguel County, Segment N-5 (Recreation) parallels State Highway 145 in T.45N., R.12W., Section 34. In Montrose County, Segment N-6 (wild) begins and ends at the national forest boundaries of T.46N., R.13W., Section 34 (figure 25).



**Figure 25. Eligible wild and scenic river segments for the San Miguel River**

Total eligible length (miles): 0.4

Eligible length on National Forest System lands (miles): 0.4

Eligible corridor area on National Forest System lands (acres): 340

Preliminary classifications: Recreational, wild

Outstandingly remarkable values: Recreation, wildlife, paleontology

### *Description of Outstandingly Remarkable Value*

The San Miguel River is a regional icon and dominant geographic and hydrologic feature. Both short eligible segments of the San Miguel River in the GMUG are part of much longer, continuous segments that are popular and unique rafting and kayaking destinations that draw visitors throughout the region.

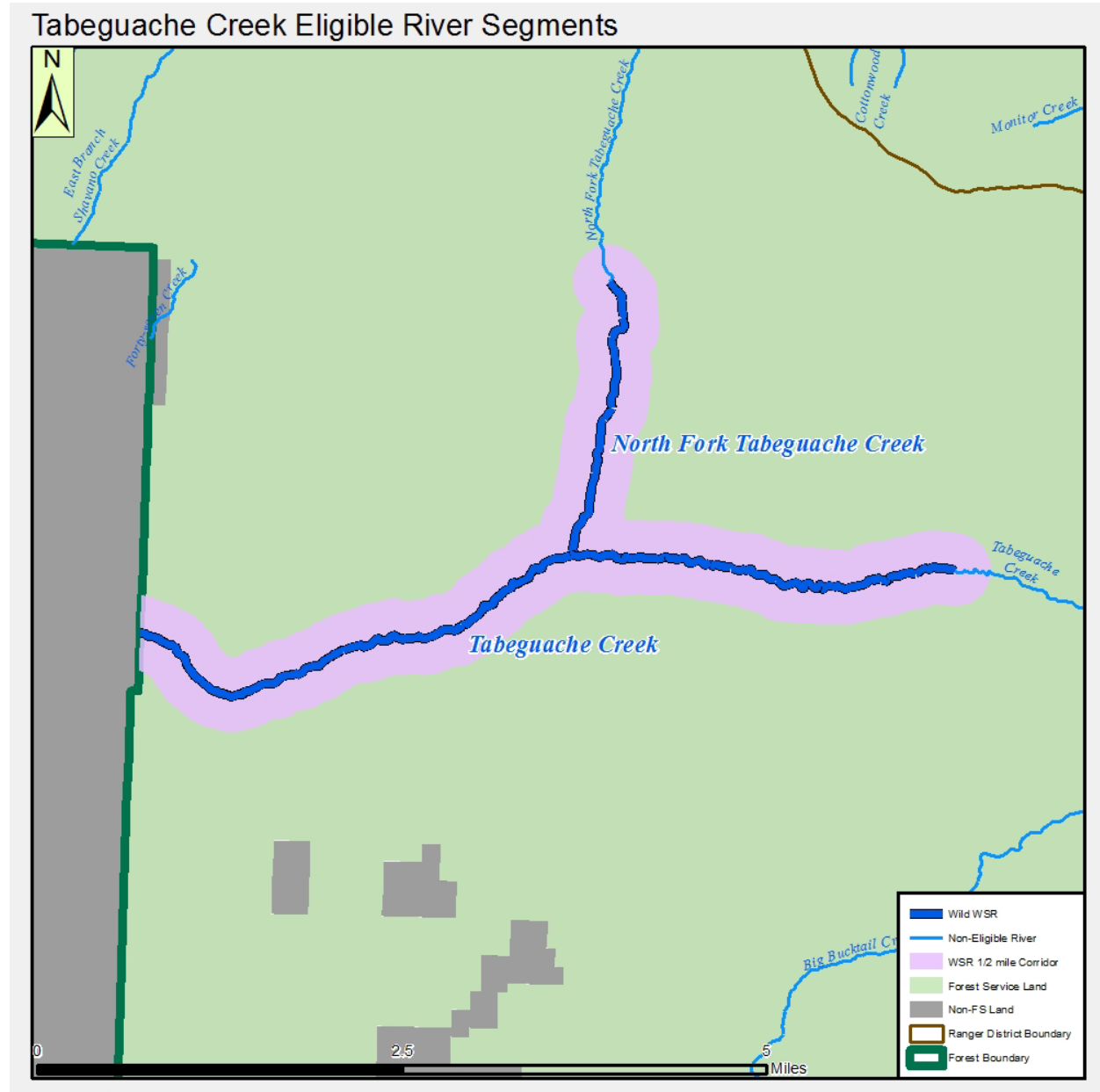
These river segments contain many fossils and meet the criteria for paleontology as an outstandingly remarkable value. Additionally, more than 300 resident and migratory bird species rely on the river and riparian zone. The Bureau of Land Management, Uncompahgre Field Office found its corresponding segments to be eligible during their 2010 Wild and Scenic Rivers evaluation.

*Rationale for Preliminary Classification*

Segment N-5 is paralleled by State Highway 145 and is directly downstream of several diversions and therefore is preliminarily classified as recreational. Segment N-6 is in a steep, remote canyon and is far less accessible than Segment N-5. Although the river has been subjected to numerous diversions and other structures at other locations, it is notably natural, undisturbed, and scenic through this segment in the GMUG. Segment N-6 is preliminarily classified as wild.

### **Tabeguache Creek (N-3) and Tributary North Fork Tabeguache Creek (N-4)**

Location: Norwood District, Montrose County. From approximately 2.9 miles upstream (east) of the confluence of Tabeguache Creek and tributary North Fork to the Uncompahgre National Forest boundary with Bureau of Land Management land. T.48N., R.14W., Sections 19, 28, 29, 30, 31, 32 and 33; T.48N., R.15W., Sections 25, 34, 35 and 36; T.47N., R.15W., Section 3 (figure 26).



**Figure 26. Eligible wild and scenic river segments for Tabeguache and North Fork Tabeguache Creeks**

Total eligible length (miles): 8.5

Eligible length on National Forest System lands (miles): 8.5

Eligible corridor area on National Forest System lands (acres): 2,660

Preliminary classification: Wild

Outstandingly remarkable values: Scenery, Historical/cultural

*Description of Outstandingly Remarkable Values*

These segments have outstanding scenic resource and historical/cultural values. The creeks wind through deep canyons carved out of red Wingate Sandstone that are lined by mature cottonwoods, with pinyon-juniper stands in the surrounding cliffs. Tabeguache Cave is a prehistoric rock shelter located along the creek that is an excellent example of desert canyon occupation and associated rock art.

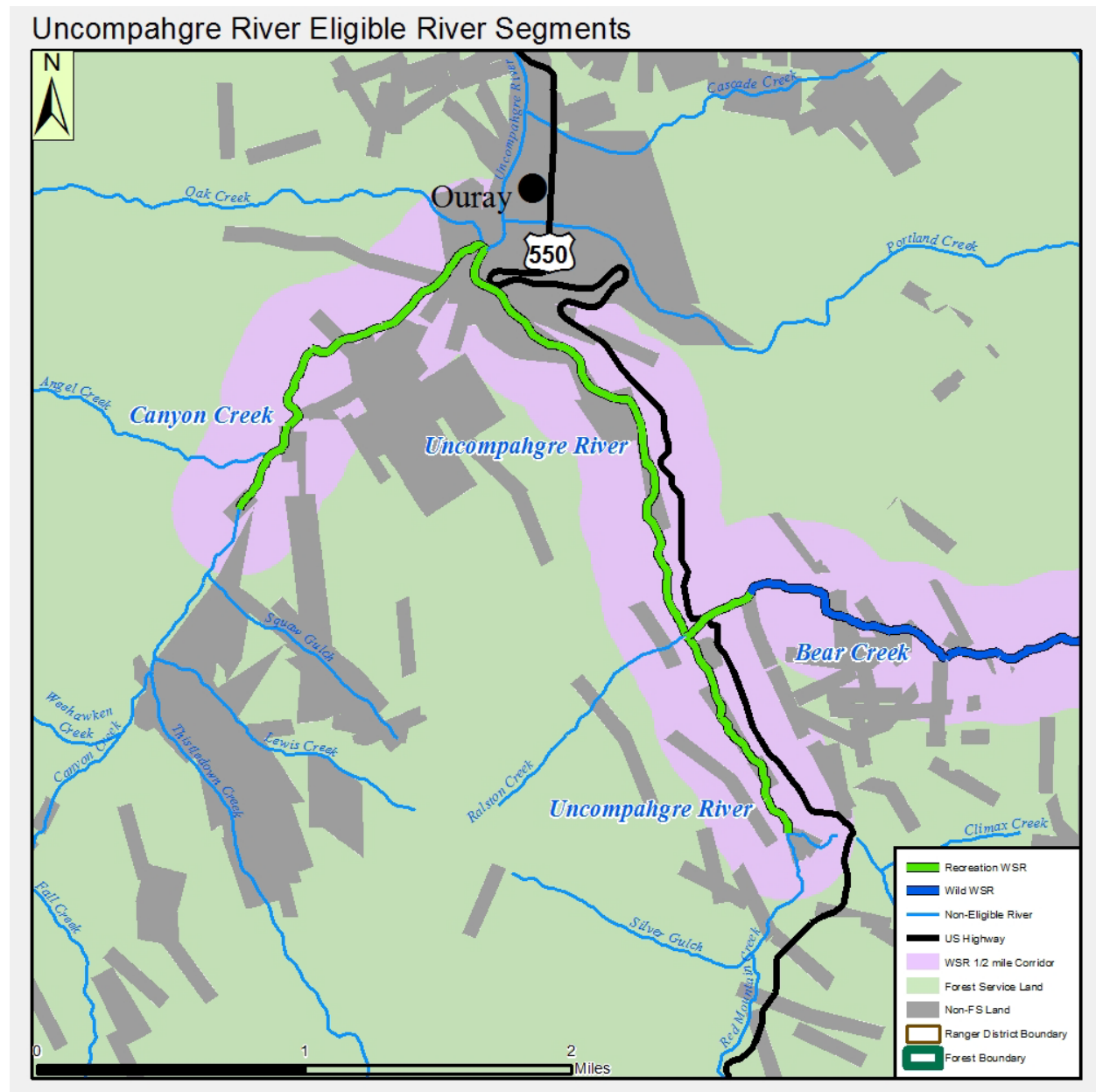
*Rationale for Preliminary Classification*

Tabeguache and its North Fork Tributary are remote and generally inaccessible except for a one-mile segment that is followed by a National Forest System trail. No roads access the segments, and the segments are free of impoundments and diversions. The Colorado Wilderness Act of 1993 designated land surrounding Tabeguache Creek as one of several special “areas” in Colorado, legislated to be managed as primitive and largely undeveloped, much like wilderness. For these reasons, these segments are preliminarily classified as wild.



### Uncompahgre River (O-3)

Location: Ouray District, Ouray County. From the confluence with Red Mountain Creek to the confluence with Canyon Creek in the city of Ouray, CO. T.43N., R.7W., Sections 5, 6, 8 and 17.; T.44N., R.7W., Section 31 (figure 27).



**Figure 27. Eligible wild and scenic river segments for the Uncompahgre River**

Total eligible length (miles): 2.7

Eligible length in the national forests on National Forest System lands (miles): 0.9

Eligible corridor area on National Forest System lands (acres): 660

Preliminary classification: Recreational

Outstandingly remarkable values: Recreation

*Description of Outstandingly Remarkable Value*

Many recreational activities are popular along the Uncompahgre River and highway 550 corridor. The steep canyon gorge and wildlife attract roadside sightseers from across the state. Advanced boating opportunities exist for outstanding whitewater kayaking in a unique narrow gorge. The Ouray Ice Park (adjacent to the Uncompahgre River) is located on city-owned lands but provides a setting for world class ice climbing.

*Rationale for Preliminary Classification*

This section of the Uncompahgre River is paralleled entirely by state highway 550. Accessing the river directly from the highway in most place is all-but impossible for most of the general public due to the rugged incised nature of the stream channel. Despite limited direct access, the noises and sights of the highway contribute to a preliminary classification of Recreational.

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## Appendix 12. Footnotes Regarding Best Available Scientific Information

This appendix includes additional documentation regarding supporting best available scientific information for select forest plan topics of particular implementation complexity and high public interest. Rather than footnoting individual topics within the body of the forest plan, many are compiled in this appendix. Per policy, national forests should review and consider best available scientific information in accordance with the FSH 1909.12 Zero Code 07.1. The FSH notes, “while the best available scientific information informs the planning process, plan components, and other plan content, it does not dictate what the decisions must be” (p. 25).

This is a select set of supporting science for the final plan direction. Documentation of all of the “best available scientific information” considered by the planning team and used in the planning process to inform plan development is included throughout the forest plan and supporting plan documents.

*See the References Cited section of this appendix for complete references.*

## Chapter 2 – Forestwide Direction, Part II

### Key Ecosystem Characteristics

#### ***Climate Refugia, FW-OBJ-ECO-04***

To support identification of areas of potential climate refugia for objective FW-OBJ-ECO-04, see Morelli et al. 2016, Dreiss et al. 2021, Conservation Science Partners 2021, or other best available science.

#### ***Terrestrial Ecosystems, FW-DC-ECO-02:***

The desired condition FW-DC-ECO-02 for terrestrial ecosystems was developed from a variety of published sources. The typical dominant fire regimes for each ecosystem are noted in the revised forest plan table 4; however, fire operates heterogeneously. Within these broad severity types, mosaics of severity are natural and desired. *See glossary for more detail.* Fire regime sources cited: Expert opinion; Aoki (2010); Baker (1992); Baker (2006); Brown and Shepperd (2003); Donnegan et al. (2001); Eisenhart (2004); Floyd et al. (2000); Floyd et al. (2004); Kulakowski and Veblen (2006); Peet (1981); Romme (1982); Romme et al. (2009); Wright et al. (1979).

Regarding ponderosa pine, seral stages are not readily applicable to ponderosa pine, rather desired structure and disturbance mechanisms are more appropriate. Desired conditions include multi-aged stands made up of small, even-aged patches (0.1 to 1 acre in size). Ideally stands would have a minimum of three to four age classes. Disturbance mechanisms include low-intensity fire with occasional areas of mixed-severity fire.

Regarding aspen, fire’s role in aspen-dominant ecosystems in southwest Colorado varies widely. *See Tepley and Veblen (2015), Coop et al. (2014), Shinneman et al. (2013), Kulakowski et al. (2004), Smith and Smith (2005), and Romme et al. (2001).*

The corresponding U.S. National Vegetation Classification macrogroup for each ecosystem is identified in table 59.

**Table 58. Crosswalk between terrestrial ecosystems and the corresponding U.S. National Vegetation Classification macrogroup**

Ecosystem	U.S. National Vegetation Classification Macrogroup
Spruce-fir	M020 Rocky Mountain subalpine-high montane conifer forest
Spruce-fir-aspen	M020 Rocky Mountain subalpine-high montane conifer forest
Aspen	M020 Rocky Mountain subalpine-high montane conifer forest
Lodgepole pine	M020 Rocky Mountain subalpine-high montane conifer forest
Cool-moist mixed conifer	M022 Southern Rocky Mountain lower montane forest
Warm-dry mixed conifer	M022 Southern Rocky Mountain lower montane forest
Ponderosa pine	M022 Southern Rocky Mountain lower montane forest
Pinyon-juniper	M027 Southern Rocky Mountain-Colorado Plateau two-needle pinyon-juniper woodland
Pinyon-juniper with shrub component	M027 Southern Rocky Mountain-Colorado Plateau two-needle pinyon-juniper woodland
Bristlecone-limber pine	M020 Rocky Mountain subalpine-high montane conifer forest
Montane shrubland, oak-serviceberry-mountain mahogany	M049 Southern Rocky Mountain montane shrubland

## Native Species Diversity

### ***Big Game, FW-DC-SPEC-12***

The Forestwide desired condition FW-DC-SPEC-12 for big game security areas is supported by Paton et al. 2017 and Ranglack et al. 2016, which indicate that big game species require relatively large habitat blocks with adequate canopy cover for security areas. Security has been defined as “the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activities” (Lyon and Christensen 1992:5).

For considering impacts of future proposed routes to achieve this desired condition, the zone of influence for motorized routes is 1,000 m (0.62 mile), and for non-motorized routes is 660 m (0.41 mile) (Wisdom et al. 2018). Note these zones of influence will not be applied to determine project consistency with the route density standard FW-STND-WLDF-02 for Wildlife Management Areas; route density baselines and future analyses for these management areas will be applied equally to all public system terra (non-winter) routes, irrespective of type of use (*see section specific to this standard in this appendix, below*). In Wildlife Management Areas, project-level consistency with the Forestwide desired condition FW-DC-SPEC-12 would be considered separately from consistency with FW-STND-WLDF-02.

Best available science documents a relationship between big game hunting opportunities and management, and big game security areas. As summarized in Canfield et al. (1999: 6.13):

Youmans (1992:7) has declared, ‘Emphasis on maintaining fall security areas and secure migration corridors is essential to meeting statewide demands for public hunting opportunity, maintaining a variety of recreational experiences and maintaining a diverse bull age structure.’ When security is inadequate, elk may become increasingly vulnerable to hunter harvest and, as Lonner and Cada (1982) pointed out, ‘A lengthy hunting season has little meaning if the majority of the harvest occurs in the first few days.’ Thus, poor security can lead to a decrease in hunter opportunity and the inability of managers to meet objectives for sex and age structure.

### **Canada Lynx, FW-STND-SPEC-35 (VEG S8)**

While the science at the time of the creation of the Southern Rockies Lynx Amendment (2008) suggested that the highest quality lynx habitat would not occur in stands with a dead overstory, and so therefore did not provide protections for such stands, the spruce beetle epidemic in the Rio Grande and GMUG National Forests in recent years offered the opportunity to test this assumption (Squires et al. 2020). Therefore, VEG S8 is designed to limit tree harvest in high-quality lynx habitat affected by the spruce-beetle epidemic. Forest stands that have experienced overstory tree mortality for which Southern Rockies Lynx Amendment Standard VEG S6 no longer applies (due to stands no longer meeting the definition of multi-storied since the overstory trees are now dead) no longer have habitat direction from the Southern Rockies Lynx Amendment that applies to them due to the changed forest condition. VEG S8 is intended to fill this gap.

Based on snowshoe hare pellet count data collected in 2018, 2019, and 2020 in spruce stands affected by the spruce beetle epidemic, mean snowshoe hare density was highest in unmanaged sites followed by previously managed sites, and lowest in salvage sites. Unmanaged and previously managed stands both contained dead overstory and live advanced regeneration, while the dead overstory had been removed from the salvage areas. Comparisons between treatments were not statistically different in 2018 and 2019. In 2020, mean hare density in salvage sites was significantly different (lower) compared to unmanaged and previously managed sites. The Science Team interpretation states, “Based on these variable results, exploration of options to mitigate impacts to dense horizontal cover during salvage should be considered. It is critical to continue to steer salvage away from high-quality Canada lynx habitat” (The Spruce Beetle Epidemic-Aspen Decline Management Response Project (SBEADMR) Science Team Monitoring Questions, Results, and Interpretation from January 2022).

*See additional supporting information and summary of best available scientific information in the FEIS, Volume I, Chapter 3, Canada lynx section.*

### **Gunnison Sage-Grouse**

#### **FW-GDL-SPEC-49**

FW-GDL-SPEC-49 for seasonal sage-grouse breeding season restrictions on total noise limits is based on Piquette et al 2014.

#### **FW-GDL-SPEC-52.a and 52.b**

For implementing Forestwide guidelines SPEC-52.a and SPEC-52.b, and supporting management approach FW-MA-SPEC-52.e, the U.S. Fish and Wildlife Service Primary Constituent Elements for Gunnison sage-grouse habitat at the time of the forest plan decision and life history chart/biological periods for Gunnison sage-grouse are listed in table 60 (for Element 2) and table 61 (for Element 3). The life history chart and biological periods for Gunnison sage-grouse are provided in table 62. Additional relevant best available science is cited below the tables.

**Table 59. Breeding habitat structural guidelines for Gunnison sage-grouse (Primary Constituent Element 2)**

[Breeding habitat is comprised of sagebrush plant communities that have the structural characteristics within the ranges described in this table. Source: derived from GSRSC 2005, p. H-6., which depicts structural values for both arid and mesic areas in Gunnison sage-grouse habitat. Here we provide the full range of these structural values to account for this variation. Habitat structure values are average values over a project area. Breeding habitat includes lek nesting, and early brood-rearing habitats (which may include agricultural fields).]

Vegetation Variable	Amount in Habitat
Sagebrush canopy cover	10 to 25 percent
Non-sagebrush canopy cover <sup>1</sup>	5 to 15 percent
Total shrub canopy cover	15 to 40 percent
Sagebrush height	9.8 to 19.7 inches (25 to 50 centimeters)
Grass cover	10 to 40 percent
Forb cover	5 to 40 percent
Grass height	3.9 to 5.9 inches (10 to 15 centimeters)
Forb height	2.0 to 5.9 inches (5 to 15 centimeters)

Includes shrubs such as horsebrush (*Tetradymia* spp.), rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia* spp.), snakeweed (*Gutierrezia sarothrae*), greasewood, (*Sarcobatus* spp.), winterfat (*Eurotia lanata*), Gambel oak (*Quercus gambelii*), snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier* spp.), and chokecherry (*Prunus virginiana*).

**Table 60. Summer-late fall habitat structural guidelines for Gunnison sage-grouse (Primary Constituent Element 3)**

[Summer-late fall habitat is comprised in part of sagebrush plant communities that have the structural characteristics within the ranges described in this table. Source: derived from GSRSC 2005, p. H-7. Summer-fall habitat includes sagebrush communities having the referenced habitat structure values, agricultural fields, and wet meadows or riparian habitat types. However, structural habitat values provided in this table do not include wet meadow or riparian habitats (which constitute Primary Constituent Element 5). Alternative, mesic habitats used primarily in the summer-late fall season, such as riparian communities, springs, seeps, and mesic meadows, are described at GSRSC 2005, pp. 30, H-7; Schroeder et al. 1999, p. 4; Connelly et al. 2000, p. 980.]

Vegetation Variable	Amount in Habitat
Sagebrush canopy cover	5 to 20 percent
Non-sagebrush canopy cover <sup>1</sup>	5 to 15 percent
Total shrub canopy cover	10 to 35 percent
Sagebrush height	9.8 to 19.7 inches (25 to 50 centimeters)
Grass cover	10 to 35 percent
Forb cover	5 to 35 percent
Grass height	3.9 to 5.9 inches (10 to 15 centimeters)
Forb height	1.2 to 3.9 inches (3 to 19 centimeters)

Includes shrubs such as horsebrush (*Tetradymia* spp.), rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia* spp.), snakeweed (*Gutierrezia sarothrae*), greasewood, (*Sarcobatus* spp.), winterfat (*Eurotia lanata*), Gambel oak (*Quercus gambelii*), snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier* spp.), and chokecherry (*Prunus virginiana*).

**Table 61. Gunnison sage-grouse life history chart and biological periods**

[Source: derived from GSRSC 2005]

Life History		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding (lek attendance)				—		—							
Nesting				—				—					
Brood-rearing <sup>1</sup>					—			—			—		
Molt	Female					—					—		
	Male					—				—			
Winter <sup>2</sup>				—							—		
Grey denotes peak activity.													
— Dashes indicate range of activity.													
<sup>1</sup> During the first two to three weeks after hatching, chicks primarily eat a protein diet of insects; afterwards they begin to eat plant material consisting of succulent forbs. Habitat quality, food availability, and predation are key factors influencing chick survival.													
Grey crosshatch denotes early brood-rearing period for the majority of hens with broods.													
<sup>2</sup> During this time period, sagebrush is used exclusively for food and cover.													



## Primary Constituent Elements for Gunnison Sage-Grouse: References

(Note: Other references cited within appendix 12 are contained in the overall plan *Reference Cited* section.)

The following references currently reflect best available science, including acknowledgment of limitations, that can be used to promote conservation and recovery, and to inform application of FW-GDL-SPEC-52.a and 52.b, which are intended to maintain or enhance sagebrush-steppe ecosystems used by Gunnison sage-grouse. This does not preclude developing or using additional or new information not cited here, determined relevant to conservation, recovery, and to inform application of the forest plan direction as the science progresses.

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Johnston, B.C., Huckaby, L., Hughes, T.J., and Pecor, J. 2001. Ecological types of the upper Gunnison Basin: Vegetation-soil-landform-geology-climate-water land classes for natural resource management. Technical Report R2-RR-2001-01, Lakewood, Colorado: USDA Forest Service, Rocky Mountain Region, 858 pp.

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- Data for above journal manuscript: Nauman, T.W., and Duniway, M.C. 2021. Soil geomorphic unit and ecological site group maps for the rangelands of the Upper Colorado River Basin region: U.S. Geological Survey data release. <https://doi.org/10.5066/P92OPRMV>

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USDA Natural Resources Conservation Service, Ecological site descriptions:

- <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/>
- <https://jornada.nmsu.edu/knowledge-systems/esd>
- <https://edit.jornada.nmsu.edu/>
- <https://edit.jornada.nmsu.edu/catalogs/esd/036X>

- <https://edit.jornada.nmsu.edu/catalogs/esd/048A>

USDA Natural Resources Conservation Service Web Soil Survey:

<https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

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USDI U.S. Fish and Wildlife Service. 2019. 5-year review for Gunnison sage-grouse (*Centrocercus minimus*). August 26, 2019. Accessed October 20, 2022, at:

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USDI U.S. Fish and Wildlife Service. 2020. Recovery implementation strategy for Gunnison sage-grouse (*Centrocercus minimus*). 2020. U.S. Fish and Wildlife Service, Upper Colorado Basin Region, Lakewood, Colorado. 75 pp. Accessed October 20, 2022, at:

[https://ecos.fws.gov/docs/recovery\\_plan/20200930\\_FWS\\_AHearne\\_RIS\\_GUSG\\_V1FINAL\\_CLEAN.pdf](https://ecos.fws.gov/docs/recovery_plan/20200930_FWS_AHearne_RIS_GUSG_V1FINAL_CLEAN.pdf)

USDI U.S. Fish and Wildlife Service. 2020. Final recovery plan for Gunnison sage-grouse (*Centrocercus minimus*). 2020. U.S. Fish and Wildlife Service, Upper Colorado River Region, Lakewood, Colorado. 32 pp. Accessed October 20, 2022, at: [https://ecos.fws.gov/docs/recovery\\_plan/2020-10-](https://ecos.fws.gov/docs/recovery_plan/2020-10-23_GUSG_FinalRP_v8.pdf)

[23\\_GUSG\\_FinalRP\\_v8.pdf](https://ecos.fws.gov/docs/recovery_plan/2020-10-23_GUSG_FinalRP_v8.pdf)

### ***FW-MA-SPEC-52.i***

Management approach SPEC-52.i regarding best practices active vegetation management in pinyon-juniper is supported by Boone et al. 2018 and 2021 and Malcolm et al. 2020.

### ***Western Toad (Previously Named “Boreal Toad”)***

#### ***Winter Buffers, FW-GDL-SPEC-20***

The 1.6-mile buffer for western toad winter hibernacula is supported by Campbell 1970.

#### ***Livestock Grazing Considerations, FW-GDL-SPEC-22.a***

Livestock grazing management in western toad habitat per plan guideline SPEC-22.a is supported by DeLong 2015 and the Boreal Toad Recovery Team and Technical Advisory Group 2001.

### **Rangeland Management**

#### ***Grass Heights and Utilization Rates, FW-STND-RNG-08.a:***

Grass heights in plan standard RNG-08.a are supported by the Watershed Conservation Practices Handbook (FSH 2509.25 2006) and utilization rates are supported by DeLong 2015. Additional scientific information used to inform the development of utilization rates and riparian metrics are available in Volume III of the FEIS, appendix 1, *Additional Literature and Sources Submitted*).

#### ***Western Toad Habitat Buffers, FW-GDL-SPEC-22.a***

(See above, section *Western Toad*).

### **Riparian Management Zones and Groundwater-Dependent Ecosystems**

#### ***Fen Wetlands, FW-STND-RMGD-07***

With respect to hydrologic alteration, the impact of forest harvest on groundwater sources as well as the effectiveness of buffers (100-foot aquatic management zones) in protecting groundwater sources are largely unknown (Dwire 2021).

With respect to sediment and nutrient input,

there is strong scientific support that fixed buffer widths mitigate these impacts for streams, but the science is less conclusive regarding fen wetlands. In northwest Montana, Jones found that a 100-foot wetland buffer was not adequate to protect vulnerable fens (poor and rich fens) from nutrient enrichment, which then altered the fen vegetation and habitat conditions for rare fen plants of concern. On the Grand Mesa, GMUG Botanist Barry Johnston (retired) monitored four fens adjacent to the Skinned Horse timber sale during 2007–2011 (pre- and post-harvest). He found that with a 100-foot buffer, annual variation in fen vegetation was within the expected natural range of variability. Three fens showed increases in sediment in 2011, which was attributed to a dust-on-snow event; nutrient levels were not measured (Johnston et al. 2011) (Dwire 2021).

Given the scientific uncertainty regarding appropriate fen protection, there is a current study by the Rocky Mountain Research Station and the Forest Service Groundwater Program in the Taylor Park and Grand

Mesa areas of the GMUG. The study will cover multiple facets critical to fen integrity: water levels, vegetation, and water chemistry, pre-and post harvests for multiple years. Knowledge gained from these studies will be used to adaptively manage future vegetation treatments, with one primary intention to inform an appropriate buffer size. Depending upon the significance of any recommended change, this buffer size modification and other pertinent associated direction could be completed with an administrative change to the plan (*See plan chapter 4 – monitoring plan*).

With consideration of the best available science, therefore, proposed forest plan direction is consistent with current recommendations for fens (Dwire 2020; Dwire 2022 personal communication), including a 100-foot Riparian Management Zone buffer distance (*see FW-STND-RMGD-07*). For fens with fen-obligate Species of Conservation Concern, a larger (600-foot) avoidance buffer for ground-disturbing activity is also included per FW-GDL-SPEC-31. Sloping fens and basin fens adjacent to steep hillslopes naturally receive sediment inputs, but pulses due to management activities in the surrounding uplands should be avoided as a best management practice.

The management approach FW-MA-RMGD-20 would afford special consideration to certain large, unusual, or pristine fens, which would be informed by ongoing research and inventories conducted in the GMUG by the Rocky Mountain Research Station (Dwire 2021).

### **Proper Functioning Condition, FW-DC-RMGD-01, FW-GDL-RNG-08.a and FW-GDL-RNG-08.b**

Proper functioning condition for hydrologic systems are defined in the following best available scientific technical reports at the time of the plan decision:

- a) Lotic: USDI BLM; USDA FS; USDA NRCS. 2015. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lotic areas, Technical Report 1737-15. Denver, Colorado;
- b) Lentic: USDI. 2020. Riparian area management: Proper functioning condition assessment for lentic areas, Technical Report 1737-16. Denver, Colorado, and other best available science; and
- c) Fens: Jones, W.M. 2003. Kootenai National Forest peatlands: Description and effects of managements. Weixelman, D.A., Cooper, D.J. 2009. Assessing proper functioning condition for fen areas in the Sierra Nevada and Southern Cascades Ranges in California, A user's guide. General Technical Report R5-TP-028. Vallejo, California. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region. 42 pp.).

## **Chapter 3 – Management Area Direction**

### **Wildlife Management Areas (MA 3.2): MA-STND-WLDF-02**

System route density in the final EIS was calculated using a Raster Route Line Density Tool in an electronic cartography program (e.g., ArcGIS, qGIS, R) with a 30x30 meter grid cell size and a 0.5-mile (908-m) search radius from the center of the grid cell. Output units are in miles per square mile and reflects the average mile per square mile density across the full Wildlife Management Area unit. Route densities are calculated for terra (non-snow) system roads and trails, and the calculations do not include administrative routes. GMUG system route data was used to calculate route densities.

This methodology should be applied to continue to implement the MA-STND-WLDF-02.

Sources for the density standard include expert opinion; Canfield et al. (1999); Miller and Hobbs (2000); Lenth et al. (2008); Reed and Merenlender (2008); Rogala et al. (2011); Preisler et al. (2013); Weidmann and Bleich (2014); Wisdom et al. (2018).

Best available science documents a relationship between big game hunting opportunities and management, and the emphasis in wildlife management areas on unfragmented habitat, including migration corridors. As summarized in Canfield et al. (1999: 6.13):

*Youmans (1992:7) has declared, 'Emphasis on maintaining fall security areas and secure migration corridors is essential to meeting statewide demands for public hunting opportunity, maintaining a variety of recreational experiences and maintaining a diverse bull age structure.' When security is inadequate, elk may become increasingly vulnerable to hunter harvest and, as Lonner and Cada (1982) pointed out, 'A lengthy hunting season has little meaning if the majority of the harvest occurs in the first few days.' Thus, poor security can lead to a decrease in hunter opportunity and the inability of managers to meet objectives for sex and age structure.*

Wisdom et al. (2018: 231) summarizes the approach intended by the GMUG for these wildlife management areas:

*Although public forests are governed by laws and policies of multiple use, not all areas can be simultaneously co-managed for recreation and recreation-sensitive wildlife. Different land allocations can accommodate such competing uses, but often on different landscapes with clear objectives about which resources are featured. Optimizing land allocations through spatial analyses of tradeoffs between competing forest uses (Wang et al. 2004), with the inclusion of human ecology mapping (McLain et al. 2013a, 2013b) and stakeholder engagement (Asah et al. 2012a, 2012b) is a forest planning approach that holds promise in helping address recreation and wildlife conflicts. We suggest that such an approach be considered in comanaging trail-based recreation and sensitive wildlife like elk on public forests.*

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## Appendix 13. Climate Change Adaptation and Forest Carbon Management – Crosswalk of Published Strategies and Revised Forest Plan Direction

Climate change is a highly complex phenomenon, and managing ecosystems for climate adaptation and carbon stewardship takes many forms. Many of the plan components in the GMUG final plan explicitly mention climate change and carbon, but there are dozens of additional components that are implicitly supportive of the goals of climate adaptation and carbon stewardship. This appendix is intended to highlight the plan components in the GMUG final plan that require or support climate-informed management. This appendix has been added between the draft and final plan in response to public interest: public comments indicated a high interest in better communication of how the GMUG plan directly related to existing climate adaptation frameworks and strategies, as well as more comprehensive climate and carbon-related direction. There is no doubt that during the life of the forest plan, best available scientific strategies and tools will rapidly evolve as methods are field-tested and collective knowledge expands, and to respond to, or anticipate, continuously changing environmental conditions. The GMUG's intention to participate in a climate adaptation collaborative, detailed below in the associated management approach, would be one avenue to identify and incorporate advancing methods - or to discontinue others - and to ideally develop a living GMUG climate adaptation plan.

Strategies for forest carbon management from the scientific literature (Ontl et al. 2020) are contained in Table 62 and climate adaptation actions and supporting activities from the Forest Service Climate Adaptation Plan (USDA Forest Service 2022) are contained in Table 63. For each strategy or adaptation action, the tables identify the corresponding plan components from the GMUG final plan that help to support or achieve the recommended action. Strategies from the references that were not relevant or did not have a corresponding plan component were omitted from the tables.

Many land management strategies are beneficial for both carbon stewardship *and* climate adaptation – there is no bright line that distinguishes one from the other. Even though several plan components could reasonably apply to multiple different strategies, no plan component appears more than once in this appendix. Instead, certain rows in the tables cross-reference each other. Note that while appendix 13 is thorough, it does not claim to be exhaustive. Plan components appearing the GMUG final plan that were omitted from Table 62 and Table 63 may nevertheless be supportive of the goals of carbon stewardship and/or climate adaptation.

Among the many new or revised plan components in the GMUG final plan, there are two new management approaches, FW-MA-CCC-01 and CCC-02. They inform the GMUG's conceptual approach and organizing framework to climate adaptation and implementation. They are reproduced in part below for reference:

**FW-MA-CCC-01: Climate Adaptation “Toolbox Approach”:** Managing for ecosystem adaptation in an era of climate change is a complex endeavor with high levels of uncertainty. No single approach will fit all future challenges, and so the best strategy is to mix different approaches for different situations. To bring coherence to all these varied actions, the GMUG will use a “toolbox approach” framework outlined by Millar et al. (2007) and elaborated by Peterson et al. (2011) and Swanston et al. (2016) that conceptualizes three broad categories of adaptation strategies: **Resistance** (actions that forestall impacts and protect highly valued resources), **Resilience** (actions that improve the capacity of ecosystems to return to desired conditions after disturbance), and **Transition** (actions that facilitate transition of ecosystems from current to new conditions).

Throughout this forest plan, management approaches that promote climate adaptation are labeled with the category of adaptation strategy that they best fit (*resistance, resilience, and/or transition*). Some management approaches will include multiple adaptation strategies (e.g., promoting landscape

connectivity could enable *resilience* as well as *transition*). “Resistance, Resilience, and Transition” are broad categorizations for the strategies, and project-level climate change strategies will need to be tailored to local and dynamic conditions.

**FW-MA-CCC-02: Climate Adaptation Collaborative:** To better understand and address the effects of climate change in the GMUG and to inform adaptation and mitigation strategies during implementation of the GMUG forest plan, participate in an open, voluntary, collaborative effort with universities, Forest Service research stations, non-governmental organizations, Tribal governments, and other interested partners. The science-management collaborative should provide a space for the development and implementation of research, management practices, and monitoring of programs, and enables stakeholders with diverse interests to share knowledge and resources to improve outcomes and enhance decisions. The collaboration would ideally result in a climate adaptation plan for the GMUG.

**Table 62. Carbon Stewardship Strategies and Actions**

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 1: Maintain or increase extent of forest ecosystems	
1.1 Avoid forest conversion to non-forest land uses	<p>FW-STND-TMBR-02: Timber harvest shall be conducted to ensure that the technology and knowledge exist to minimally restock areas suitable for timber production with tree seedlings within 5 years after final harvest. Minimum restocking levels for areas suitable for timber production are defined in table 17. Exception: Exceptions to these minimum levels are allowed if supported by a project-specific determination of adequate restocking, e.g., when stands are treated to reduce fuel loadings, to create openings for scenic vistas, to transition a site to an ecosystem better adapted to future climates, to support research experiments, or to remove encroaching trees to meet desired wildlife habitat conditions. Restocking levels for areas unsuitable for timber production must be specified with the silvicultural prescription. Project-specific determination of minimum stocking must be consistent with all other applicable plan components. <i>This standard is required by law and policy; see (36 CFR 219.11(d)(5)).</i></p> <p>FW-MA-TMBR-14: Avoid permanent forest conversion to non-forest from management activities and/or uncharacteristic wildfire, while acknowledging that climate change adaptation may warrant accepting type conversions to non-forest or even the managed facilitation to non-forest (<i>Resistance, Resilience, Transition</i>).</p>
1.2 Reforest lands that have been deforested and afforest suitable lands	<p>FW-DC-ENMI-02: Abandoned and inactive mines disturbed by past mineral exploration and mine development have been returned to stable conditions and an appropriate, functioning vegetative state, and do not pose health, safety, or environmental hazards. <i>See also the Forestwide guidelines for bats, SPEC-10 and -11.</i></p> <p>FW-OBJ-ENMI-02.a: Reclaim or address one abandoned mine land (AML) feature each year to protect water quality, classified water uses, and/or public health or safety.</p>
Strategy 2: Sustain fundamental ecological functions	
2.1 Reduce impacts on soils and nutrient cycling	<p>FW-DC-ECO-06: Vegetation protects soil, facilitates moisture infiltration, and contributes to nutrient cycling. Vegetation characteristics (e.g., tree density, litter depth) support favorable water flow and quality. Coarse and fine woody debris and snags occur at levels sufficient to support soil productivity and wildlife habitat, with a range of sizes and decomposition levels of woody debris.</p> <p>FW-DC-SOIL-01: Soil quality and function sustain ecological processes.</p>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.1 Reduce impacts on soils and nutrient cycling (continued)	<p>FW-STND-SOIL-02: Management activities shall not create detrimental soil conditions, including loss of ground cover, severely burned soils, detrimental soil displacement, erosion, or compaction, on more than 15 percent of an activity area. In activity areas where less than 15 percent of 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 shall not exceed the conditions prior to the planned activity and shall move toward a net improvement in soil quality. The limit is not intended to apply to administrative sites or other areas with dedicated uses such as the permanent transportation system, well pads, or ski areas, for example.</p>
	<p>FW-STND-SOIL-03: When decommissioning roads, temporary roads, skid trails, trails, landings, burn pile scars, and non-National Forest System roads and trails, use treatment methods that have been demonstrated to improve soil productivity and quality and watershed hydrologic function.</p>
	<p>FW-GDL-SOIL-04: To reduce the potential for rill or gully erosion occurring along equipment tracks, untethered, ground-based mechanical equipment should not operate on sustained slopes greater than 40 percent.</p>
	<p>FW-GDL-SOIL-05: To maintain long-term soil quality and stability, new surface-disturbing management activities should not occur on landslide-prone areas.</p>
	<p>FW-GDL-SOIL-06: To provide nutrients and reduce soil erosion, project activities should provide sufficient effective ground cover (e.g., duff, litter, and downed woody debris) so that pedestals, rills, and surface runoff from the activity area are not increased. Downed woody debris is retained per the Forestwide guideline for Key Ecosystem Characteristics, ECO-07.</p>
	<p>FW-GDL-SOIL-07: To maintain the presence of biological soil crusts in the GMUG, management activities in areas with these crusts should be designed to minimize surface disturbance. <i>See also the Forestwide range standard RNG-06.</i></p> <p>FW-MA-SOIL-08: Seek opportunities to support production of biochar (a charcoal soil amendment made from biomass) from waste woody biomass generated by fuel treatments and forest restoration. When applied as a soil amendment, biochar improves soils by reducing bulk density, increasing porosity, providing a substrate for microorganisms, improving water holding capacity, retaining nutrients, and increasing organic matter, among other benefits. Producing biochar helps to mitigate climate change by storing carbon in long-lived material that would otherwise be released more quickly into the atmosphere and has the added benefits of reducing smoke and burn scars from disposal by pile burning (Rodriguez Franco et al. 2022). (<i>Resistance, Resilience</i>).</p>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.1 Reduce impacts on soils and nutrient cycling (continued)	<p>FW-OBJ-REC-06: Eliminate and rehabilitate at least one unauthorized travel route annually.</p> <p>FW-GDL-TMBR-08: To minimize erosion, post-wildfire timber salvage should not occur in areas with high soil burn severity and not yet recovered, unless the removal of hazard trees is necessary for safety or to reduce risk to infrastructure. <i>See also Forestwide standard SOIL-02.</i></p>
2.2 Maintain or restore hydrology	<p>FW-DC-AQTC-02: Water flows are sufficient to create and maintain riparian, aquatic, and wetland habitats; retain patterns of sediment, nutrient, and wood routing and transport while maintaining reference dimensions (e.g., bankfull width, depth, entrenchment ratio, sufficient pool depth to provide summer refugia and winter habitat, slope, and sinuosity); ensure floodplain inundation occurs, allowing floodplain development; and ensure that the timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Flows may also support water-related recreation including boating.</p> <p>FW-GDL-SPEC-57: To reduce sedimentation, for subwatersheds included in the conservation watershed network, net increases in stream crossings and road lengths should be avoided in the riparian management zone unless the net increase improves ecological function in aquatic ecosystems. The net increase is measured from the beginning to the end of each project, such that temporary routes may be constructed, so long as properly closed and decommissioned. <i>See the Riparian Management Zones and Groundwater-dependent Ecosystems section for detailed direction regarding temporary and permanent infrastructure in the riparian management zone.</i></p> <p>FW-DC-RMGD-01: Riparian management zones have the distribution of physical, chemical, and biological conditions appropriate to support their inherent resiliency to natural disturbances, human activities, and climate variability. As defined in best available scientific technical reports, they are functioning properly due to lateral migration—where applicable—and a connection between the stream channel/water source and the associated riparian area.</p> <p>FW-DC-RMGD-02: Within the riparian management zones, the biological composition of native flora (e.g., willows, cottonwoods, sedges) and fauna (e.g., beaver) support the associated ecosystem services (e.g., filtering of sediment, modulation of floods, drought resiliency, carbon uptake and storage); providing a dynamic equilibrium of natural structure (e.g., channel morphology, floodplain development, large wood) and connectivity (e.g., periodic flooding, aquatic organism passage. Shade is maintained. The species composition provides the ecosystem services of water and carbon storage (particularly in fens—which are among the most carbon-dense ecosystems on the planet—and other wetlands).</p> <p>FW-DC-RMGD-03: Hydrologic processes (e.g., infiltration, streamflow, sediment transport, hillslope runoff, or groundwater flow) within the riparian management zones function properly, providing appropriate periodic and/or permanent hydrologic connectivity and thereby sustaining native species composition.</p>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.2 Maintain or restore hydrology (continued)	FW-DC-RMGD-04: For streams, within the respective landform (e.g., valley bottom or confined canyon), the natural stream channel and floodplain (e.g., channel type, width-to-depth ratio) functions naturally or is restored to a dynamic equilibrium.
	FW-DC-RMGD-05: Groundwater-dependent ecosystems and wetlands function under natural patterns of recharge, flow, and discharge within the respective landform (e.g., basin, hillslope). The water sources and hydrologic processes (e.g., suitable water table elevations, natural spring flow) needed to support groundwater-dependent ecosystems provide for the persistence of associated native plant and animal populations. Natural water quality is maintained. Fens continue to accumulate peat.
	FW-OBJ-RMGD-06: During each 10-year period following plan approval, considering the historic extent of the watershed and riparian systems, restore or enhance at least 2,500 acres of riparian and wetland habitat – including groundwater-dependent ecosystems, and restore or enhance hydrologic function for at least 50 miles of perennial, intermittent, or ephemeral streams....
	FW-STND-WTR-05: Management activities shall maintain or restore the connectivity, composition, function, and structure of watersheds in the long-term, as consistent with the Watershed Conservation Practices Handbook and its exceptions (FSH 2509.25) and National Core Best Management Practices (FS 990a) or equivalent direction.
	FW-STND-RMGD-08: Vegetation management shall only occur in the riparian management zone if the purpose is to restore or enhance ecological integrity of aquatic and riparian ecosystems. <i>For vegetation management that meets this standard, see also direction below for constraints on associated ground disturbance.</i>
	FW-STND-RMGD-10.a: Reconstructed and new temporary and permanent infrastructure in riparian management zones, as authorized or constructed by the Forest Service, (e.g., minimum necessary water impoundments and diversions, culverts, and stream crossings), shall be pre-approved by the Forest Service for the total footprint and method of ground disturbance, with particular emphasis on potential impacts to beaver habitat. <i>See supporting management approach FW-MA-RMDG-22 regarding interactions with beaver habitat.</i>
	FW-GDL-RMGD-17: To maintain beaver populations and the ecological functions that beavers provide, management actions should use techniques that sustain beavers (e.g., flow devices to protect infrastructure, using pipes to reduce water levels, and beaver dam analogues), while also mitigating undesired effects of beaver dams.

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.2 Maintain or restore hydrology (continued)	<p>FW-MA-RMGD-21: For climate change adaptation, Rondeau et al. (2020) contains a description of a planning framework and a catalog of additional climate adaptation strategies specifically for seeps, springs, and wetlands, but which are applicable to all riparian and aquatic ecosystems. Revised plan direction supports the following strategies:</p> <ul style="list-style-type: none"> <li>▪ Enhance resiliency of riparian and aquatic ecosystems to climate change by maintaining hydrological connections and processes and restoring or improving the condition of these ecosystems to support a variety of wildlife species and ecosystem services including livestock grazing and recreation. (<i>Resilience</i>)</li> <li>▪ Manage human uses on the landscape in ways that benefit the hydrologic connections and health of native riparian and aquatic species, e.g., recreation, livestock grazing, energy development, water systems, mining, roads, and research. (<i>Resilience</i>)</li> <li>▪ Maintain large wood in the floodplain and active stream channels and vegetation cover sufficient to catch sediment, dissipate energy, and prevent erosion. (<i>Resistance, Resilience</i>)</li> </ul>
2.3 Prevent the introduction and establishment of invasive plant species and remove existing invasives.	<p>FW-DC-IVSP-01: Terrestrial and aquatic native plant communities composed of a diverse mix of native grass, forb, shrub, riparian, and tree species dominate the landscape, while invasive plant and animal species, including aquatic nuisance species, are nonexistent or low in abundance and do not disrupt ecological function.</p> <p>FW-OBJ-IVSP-02: Annually, invasive species management actions are completed on at least 2,000 acres so that new infestations are prevented; densities of existing infestations are reduced; total acres or areas infested are reduced; infested areas are restored/rehabilitated; existing infestations are contained, controlled, suppressed, or eradicated depending on infestation characteristics (e.g., size, density, species, location), management opportunities, and resource values at-risk; and uninfested areas are maintained and/or protected...</p> <p>FW-STND-IVSP-03: For all proposed activities, associated risk of invasive and aquatic nuisance species introduction or spread shall be mitigated using best management practices and integrated pest management practices (USDA Forest Service 2013b) that are commensurate with the potential risk, including but not limited to decontamination procedures on vehicles and equipment and the use of weed-free products.</p> <p>FW-STND-IVSP-04: Contracts and permits for activities in the national forests, including facility maintenance and leases, shall include best management practices to prevent associated introduction and/or spread of invasive plant and aquatic nuisance species. (<i>see USDA Forest Service. National Strategic Framework for Invasive Species Management. FS-1017, August 2013</i>). Examples of mitigation include: using decontamination procedures on vehicles and equipment, using weed-free products, and reseeding with native plant species....</p>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.3 Prevent the introduction and establishment of invasive plant species and remove existing invasives (continued)	<p>FW-STND-IVSP-05: The Forest Service shall require the inspection by a certified inspector of watercraft (motorized and non-motorized, unless on the exempt list), or restrict or prohibit use of such watercraft on water bodies identified as at-risk for aquatic nuisance species by Colorado Parks and Wildlife guidelines.</p> <p>FW-GDL-IVSP-06: To prevent the spread and establishment of invasive plant species following surface-disturbing activities, areas identified as needing mitigation should be reseeded at the optimal time for optimal native revegetation per site-specific characteristics. Reseeding should be done with a mixture of plant species native to the context area, capable of establishment, and should include species preferred by pollinators. See also the <i>Pollinator</i> section.</p> <p>FW-GDL-IVSP-09: To prevent the introduction of invasive plant species, gravel and other soil or fill products placed on National Forest System lands should be sourced from pits that implement invasives control mechanisms.</p> <p>FW-MA-IVSP-12: Promote early detection and rapid response as an effective approach to minimize spread of invasive species (Resistance).</p>
<p>2.4 Maintain or improve the ability of forests to resist pests and pathogens.</p> <p>2.5 Reduce competition for moisture, nutrients, and light</p>	<p>Management Approaches for Vulnerable Ecosystems, FW-MA-ECO-04.b:</p> <p><u>Bristlecone and Limber Pine Landscapes:</u>  Increase population size and age class diversity of bristlecone and limber pine through the following practices to maintain maximum possible resilience and offset future mortality due to white pine blister rust (<i>Resilience</i>):  plant limber pine seedlings with quantitative resistance,  plant local bulked seed lots of bristlecone pine,  plant both species in both current and future suitable habitat (e.g., outside of current distribution), and/or  reduce competitor density around bristlecone/limber pine to increase cone production near disturbances to support natural regeneration.</p> <p><u>Pinyon-Juniper Landscapes:</u>  Protect and maintain large, interconnected, functional, and resilient pinyon-juniper landscapes that support persistent populations of pinyon-juniper obligate species. (<i>Resistance, Resilience</i>)</p> <p><u>Sagebrush Landscapes:</u>  Improve and maintain ecological processes and condition across the landscape such that outcomes support a variety of sagebrush-obligate and other species and land-based livelihoods such as livestock grazing, while managing invasive species and reducing erosion and water loss. (<i>Resilience</i>)</p>



Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 2: Sustain fundamental ecological functions	
2.4 Maintain or improve the ability of forests to resist pests and pathogens.	Management Approaches for Vulnerable Ecosystems, FW-MA-ECO-04.b (continued): <u>Spruce-Fir Landscapes:</u> Manage the system so that it can respond to change and is less vulnerable to drought and changes in forest composition from disturbance (e.g., wildfire, insect outbreaks). ( <i>Resilience</i> ) See also several related management approaches in the timber section.
2.5 Reduce competition for moisture, nutrients, and light (continued)	
Strategy 3: Reduce carbon losses from natural disturbance, including wildfire	
3.1 Restore or maintain fire in fire-adapted ecosystems.	<p>FW-DC-AQ-03: Wildland fuel loadings resemble natural range of variation conditions, reducing the potential for harmful effects on air quality from high-intensity wildfires.</p> <p>FW-DC-ECO-02: Ecosystems are resilient to the frequency, extent, and severity of disturbances (such as wildland fire in fire-adapted ecosystems, flooding in riparian systems, insects, and pathogens). Natural disturbance regimes, including wildland fire, are restored where practical and allowed to function in their natural ecological role to enhance resources, including habitat for species associated with fire-adapted systems. Native insect and disease populations are generally at endemic levels with occasional outbreaks, and the scale of insect and disease outbreaks is restricted by variation among vegetation structures. Uncharacteristic disturbances due to climate change are minimal, and management actions mitigate undesirable outcomes of such disturbances....</p> <p>FW-DC-FFM-01: Life, investments, and valuable resources including fire's sensitive natural resources are protected. Wildland fires in the wildland-urban interface and near infrastructure primarily exhibit surface fire behavior with flame lengths typically less than 4 feet; the potential for torching, crowning, and spotting, as well as the resistance to control, are low. Redundant natural and manmade barriers are present and strategically located on the landscape to provide both defensible space and safe locations for firefighters to be successful with management efforts.</p> <p>FW-DC-FFM-01.a: In fire-adapted ecosystems, periodic use of fire creates conditions that reduce mortality from uncharacteristic wildfire and promotes forest structure and composition that meet a variety of ecosystem services, including forest products and carbon uptake and storage.</p> <p>FW-OBJ-FFM-02: To move toward desired ecological conditions (see <i>Key Ecosystem Characteristics</i> section) and reduce the risks and negative impacts of uncharacteristic wildland fire, treat approximately 110,000 acres in the first decade of plan implementation, and 150,000 acres in the second decade, through the implementation of vegetation management techniques, including the use of wildland fire (planned and unplanned) and mechanical methods (e.g., thinning of ladder fuels and mastication)...</p>
3.2 Establish natural or artificial fuel breaks to slow the spread of catastrophic fire.	
3.3 Alter forest structure or composition to reduce the risk, severity, or extent of wildfire	

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 3: Reduce carbon losses from natural disturbance, including wildfire	
<p>3.1 Restore or maintain fire in fire-adapted ecosystems;</p> <p>3.2 Establish natural or artificial fuel breaks to slow the spread of catastrophic fire;</p> <p>3.3 Alter forest structure or composition to reduce the risk, severity, or extent of wildfire (continued)</p>	<p>FW-MA-FFM-04: Prescribed fire and use of wildfire have been and will continue to be important management tools in sustaining ecological integrity of fire-adapted ecosystems in the GMUG in the future. Prescribed fire and the use of wildfire to achieve land management objectives can be appropriate tools to treat and restore vegetative composition, structure, and function where fire is a primary natural disturbance (<i>Resistance, Resilience</i>).</p> <p>FW-MA-FFM-06: Work with partners to prioritize fuels treatments to protect existing transportation and water-use related infrastructure, as informed by the <i>GMUG Watershed Vulnerability Assessment</i> (USDA Forest Service 2013a) (<i>Resistance, Resilience</i>).</p> <p>FW-MA-RNG-16: Apply targeted grazing to support specific hazardous fuels reduction and prescribed fire treatments, where appropriate (<i>Resilience</i>).</p>
<p>3.4 Reduce the risk of tree mortality from biological or climatic stressors in fire-prone systems;</p> <p>3.5 Alter forest structure to reduce the risk, severity, or extent of wind and ice damage</p>	<p>FW-MA-TMBR-20: Mitigate carbon loss from tree mortality:</p> <ul style="list-style-type: none"> <li>• In stands in which blowdown is not a concern to reduce competition, types, consider thinning even-aged stands to reduce competition for limited soil moisture on drought-prone sites. (<i>Resilience</i>)</li> <li>• Consider reduction of stand densities in sites susceptible to beetle infestation. Use caution when thinning shallow-rooted species in mature stands, such as Engelmann spruce and lodgepole pine, as individual trees are prone to windthrow. Windthrown trees can trigger beetle outbreaks, leading to additional tree mortality. (<i>Resilience</i>)</li> </ul>
Strategy 4: Enhance forest recovery following disturbance	
<p>4.1 Promptly revegetate sites after disturbance;</p> <p>4.2 Restore disturbed sites with a diversity of species that are adapted to future conditions;</p> <p>4.4 Guide species composition at early stages of development to meet expected future conditions</p>	<p>FW-MA-TMBR-16: Climate-informed revegetation post-disturbance:</p> <ul style="list-style-type: none"> <li>• Create suitable conditions for natural regeneration through site preparation. (<i>Resistance, Resilience</i>)</li> <li>• Promote regeneration of species currently present that have wide ecological tolerances and can persist under a wide variety of climate and site conditions. (<i>Resilience, Transition</i>)</li> <li>• Favor or establish drought- or heat-tolerant species on south-facing slopes, sites with sandy or shallow soils, or narrow ridgetops. (<i>Resilience, Transition</i>)</li> <li>• If seeding is needed in disturbed sites, identify and procure site-appropriate native plant materials and apply at time of year when site is accessible and to promote a successful outcome. The resulting herbaceous plant community should reflect project goals (e.g., stabilization, pollinator-friendly) and restore site conditions on trajectory toward desired conditions. (<i>Resilience</i>)</li> </ul>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 4: Enhance forest recovery following disturbance	
<p>4.1 Promptly revegetate sites after disturbance;</p> <p>4.2 Restore disturbed sites with a diversity of species that are adapted to future conditions;</p> <p>4.4 Guide species composition at early stages of development to meet expected future conditions. (continued)</p>	<ul style="list-style-type: none"> <li>Plant tree species expected to be adapted to future conditions and resistant to insect pests or present pathogens. <i>(Resilience, Transition)</i></li> <li>Plant larger individuals (saplings versus seedlings, or containerized versus bare-roots stock) to help increase survival. <i>(Resistance, Resilience)</i></li> <li>Plant a broader mix of species and trees with higher genetic variation than may have formerly been present and allow natural selection to mediate tree survival. <i>(Resilience, Transition)</i></li> </ul> <p>FW-MA-SPEC-08.a: When possible, use pollinator-friendly and climate-smart seed mixes in restoration and revegetation projects to support native pollinator species and increase resilience to future climate conditions <i>(Resilience)</i>.</p>
4.3 Protect future-adapted seedlings and saplings	<p>FW-MA-TMBR-17: Protect future-adapted seedlings and saplings: Use repellent sprays, bud caps, or fencing to prevent browsing on species that are expected to be well-adapted to future conditions. <i>(Resilience, Transition)</i></p> <p>Protect advanced regeneration from damage during timber harvest activities. <i>(Resilience)</i></p>
Strategy 5: Prioritize management of locations that provide high carbon value across the landscape	
5.1 Prioritize low-vulnerability sites for maintaining or enhancing carbon stocks	<p>FW-GDL-RMGD-11.a: To maintain function of fen wetlands and other wetlands, the GMUG should restrict new authorizations for water diversions and impoundments that would negatively impact wetlands. Authorizations should not negatively affect any wetlands, in moderate to good condition.</p> <p>FW-MA-TMBR-19: Maintain carbon storage in low-vulnerability sites:</p> <ul style="list-style-type: none"> <li>Increase retention of large diameter trees on sites with low vulnerability to drought stress or sites that otherwise minimize exposure to stressors that could increase tree mortality. <i>(Resistance)</i></li> <li>Increase redundancy of important sites for existing carbon storage across the landscape. <i>(Resilience)</i></li> <li>Promote silvicultural prescriptions that increase structural retention, such as selection cutting, shelterwood, or other low-intensity harvest methods. <i>(Resistance, Resilience)</i></li> </ul>
5.2 Establish reserves on sites with high carbon density	FW-STND-RMGD-08: Vegetation management shall only occur in the riparian management zone if the purpose is to restore or enhance ecological integrity of aquatic and riparian ecosystems...

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 6: Maintain or enhance existing carbon stocks while retaining forest character	
<p>6.1 Increase structural complexity through retention of biological legacies in living and dead wood</p>	<p>FW-GDL-ECO-07: To maintain ecological integrity, soil productivity, and persistence of associated native species, vegetation management activities should retain at least the minimum snag levels and the lower end of the optimal downed wood and coarse woody debris levels noted in table 5. Exceeding the upper end of the optimal range of downed wood or coarse woody debris is acceptable if not contradictory to project objectives (e.g., fuels reduction)...</p> <p>FW-DC-ECO-08: Old forest, as defined and characterized by ecosystem in plan appendix 6, are well-distributed within all forested ecosystems, and occur in amounts and patch sizes needed to support species that depend on old forest characteristics. Old forest contributes to ecosystem integrity, provides habitat for associated species, serves as an important reservoir for carbon, and contributes to overall ecosystem biodiversity. Natural disturbance processes continue to influence old forest conditions...</p> <p>FW-MA-ECO-08.a: Use available data (remotely sensed products and existing forest inventory) to improve spatial inventory of old forest and potential old forest in the GMUG.</p> <p>FW-MA-ECO-08.b: On a landscape scale, prioritize retention of old forest characteristics that provide habitat for at-risk species, that has limited access, and/or is considered to be climate refugia (<i>Resistance</i>). <i>See also plan direction FW-GDL-ECO-07 and FW-GDL-SPEC-11.</i></p> <p>FW-GDL-SPEC-11: To maintain population persistence and nesting habitat for the guild of cavity-dependent species (e.g., bats, owls), active management should maintain larger dead and live trees within residual patches. These patches should be scattered throughout the treatment area where feasible, and the total extent retained should be determined during site-specific analysis to meet the purpose of the guideline for cavity-dependent species...</p>
<p>6.4 Disfavor species that are distinctly maladapted;</p> <p>6.5 Manage for existing species and genotypes with wide moisture and temperature tolerances</p>	<p>Management Approaches for Vulnerable Landscapes (ECO):</p> <p><u>Alpine Ecosystems:</u> Accept the possibility that alpine areas will decrease in size under climate change and concentrate management efforts in high priority areas, such as areas with at-risk and other special status species. Monitor tree establishment and potential shift in subalpine spruce-fir communities into alpine areas. (<i>Transition</i>)</p> <p><u>Pinyon-Juniper Landscapes:</u> Accept that some species are vulnerable and difficult to maintain in their current site. When possible, allow and assist migration into upper elevation zones that do not currently support pinyon and juniper, as well as retreat from areas that are unlikely to have a suitable climate for pinyon-juniper regeneration. (<i>Transition</i>)</p>

Approaches for Forest Carbon Management, Ontl et al. (2020)	GMUG Revised Forest Plan Direction
Strategy 6: Maintain or enhance existing carbon stocks while retaining forest character	
<p>6.4 Disfavor species that are distinctly maladapted;</p> <p>6.5 Manage for existing species and genotypes with wide moisture and temperature tolerances. (continued)</p>	<p>Management Approaches for Vulnerable Landscapes (ECO) (continued):</p> <p><u>Spruce-Fire Landscapes</u>: Use an adaptive approach to managing spruce-fir populations depending on climatic suitability and response to disturbance. Consider embracing major changes, such as expanding aspen stands or shifting to climate-adapted vegetation communities. (<i>Transition</i>)</p> <p>FW-MA-TMBR-21: Improve genetic fitness of native vegetation:</p> <ul style="list-style-type: none"> <li>Remove unhealthy, declining species within a site to promote other species expected to fare better under current and future climate conditions. (<i>Transition</i>)</li> <li>Protect healthy legacy trees that fail to regenerate while deemphasizing their importance/representation in the mix of species being promoted for regeneration. (<i>Transition</i>)</li> <li>Plant or otherwise promote species that have a large geographic range, occupy a diversity of site locations, and are projected to have increases in suitable habitat and productivity. (<i>Transition</i>)</li> </ul>
6.6 Promote species and structural diversity to enhance carbon capture and storage efficiency	FW-DC-ECO-01: Ecosystems contain a mosaic of vegetation age classes, densities, and structures. This mosaic occurs at a variety of scales such as geographic and watershed scales, reflecting the disturbance regimes that naturally affect the area. Natural ecological cycles (e.g., hydrologic, energy, nutrient, disturbance, carbon, etc.) facilitate the shifting of plant communities, structures, and ages across the landscape over time.
6.7 Use seeds, germplasm, and other genetic material from across a greater geographic range	<p>FW-MA-TMBR-18: Use geographically diverse seeds:</p> <p>Use mapping programs to match seeds (of same species) collected from a known origin to planting sites based on climatic information to optimize recruitment and survival in future climates. (<i>Resilience</i>)</p> <p>Identify and communicate needs for new or different genetic material to seed suppliers or nurseries to increase diversity of available stock. (Resilience)</p>
Strategy 7: Enhance or maintain sequestration capacity through significant forest alterations	
7.1 Favor existing species or genotypes that are better adapted to future conditions	FW-DC-TMBR-B: On lands suitable for timber production, planting environments favor seedling survival, sustainable recruitment levels, and species composition to allow for long-term resilience of the developing forest, while considering best available scientific information regarding modeled future changes in climate. Stand densities are appropriate to impart resilience to future drought stress, fire, and insect outbreaks. Species and genotypes expected to fare better in future climate conditions are promoted.
7.2 Alter forest composition or structure to maximize carbon stocks	FW-MA-TMBR-15: When developing integrated, landscape-scale ecological restoration projects, use the Forest Carbon Management Menu (Ontl et al. 2020), General Technical Report WO-95 (Janowiak et al. 2017), or other best available science to inform strategies that support long-term carbon uptake and storage along with other management objectives. See plan appendix 13 for forest plan direction crosswalk to climate adaptation strategies. (Resistance, Resilience).

**Table 63. Climate Adaptation Strategies and Actions**

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
1a: Implement the Wildfire Crisis Strategy through climate-informed actions	
Increase the use of planned and unplanned ignitions across shared landscapes while accommodating seasonal shifts in burning opportunities and other implementation challenges brought on by climate change.	[See entries in Table 63 under “Strategy 3: Reduce carbon losses from natural disturbance, including wildfire”]
Carry out thinning treatments that reduce near-term wildfire risks and allow landscapes to accommodate beneficial fire, thereby facilitating long-term adaptation to climate related changes in wildfire and other disturbances and stressors.	[See entries in Table 63 under “Strategy 3: Reduce carbon losses from natural disturbance, including wildfire”]
1d. Prepare for more post-fire landscapes	
Implement the Burned Area Recovery program to address nonemergency post-fire restoration needs and adapt recovering ecosystems to changing climate conditions.	FW-MA-FFM-09: When implementing post-fire restoration actions, work with partners to help recovering ecosystems adapt to changing climate conditions. This may include strategies to facilitate transitions to ecosystems that are better adapted to future climates. See complementary management approaches for regeneration and replanting in the Timber section, especially FW-MA-TMBR-16, 17, 18. (Resilience, Transition).
Implement fuels treatments, including planned ignitions, to reduce risks of reburns and take advantage of the beneficial effects of wildfires for ecological integrity.	[See entries in Table 63 under “Strategy 3: Reduce carbon losses from natural disturbance, including wildfire”]
Carry out longer term post-fire restoration, regeneration, and planting, including strategies based on the best available science to facilitate transitions to ecosystems that are adapted to future climates where appropriate.	[See entries in Table 63 under “Strategy 4: Enhance forest recovery following disturbance”]
2b: Help watersheds adapt to changing conditions, drought, and flooding	
Implement projects that improve watershed function and prepare streams, rivers, and other water bodies for extreme events, flooding, and changes in hydrology.	FW-DC-SPEC-53: Conservation watershed networks have high-quality habitat and functionally intact ecosystems that contribute to and enhance conservation and recovery of specific target species. Each network contributes to establishment of a metapopulation to improve the resiliency of the respective population.  FW-OBJ-SPEC-54: Within 5 years of plan approval, develop strategic plans for the target species (Western Toad (previously named the “Boreal Toad”) and green-lineage Colorado River cutthroat trout). Within 10 years of plan approval, complete two activities to restore or enhance habitat and address pertinent threats.

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
2b: Help watersheds adapt to changing conditions, drought, and flooding	
Implement projects that improve watershed function and prepare streams, rivers, and other water bodies for extreme events, flooding, and changes in hydrology. (continued)	[See also entries in Table 63 under “2.2 Maintain or restore hydrology”]
Design and maintain infrastructure, including roads, buildings, and stream crossings, to accommodate increases in flooding and geologic hazards such as landslides...	[See entries in Table 63 under “2.2 Maintain or restore hydrology”] [See also entries in Table 64 below under “6d: Reduce risks and improve capacity in agency operations and infrastructure”]
2c: Help ecosystems adapt to intensifying disturbances and extreme events	
Design wildfire risk reduction and forest restoration treatments to account for multiple climate-driven disturbances.	[See entries in Table 63 under “Strategy 3: Reduce carbon losses from natural disturbance, including wildfire”]
Increase the resistance of rangeland vegetation to invasive grasses through active management and research, considering vulnerability to climate change, increased fire, and other disturbances in prioritizing treatments.	[See entries in Table 63 under “2.3 Prevent the introduction and establishment of invasive plant species and remove existing invasives”]
3c: Manage ecosystems for long-term change	
Support climate-informed reforestation and restoration, using climate decision support tools to assist in native seed sourcing and planting climate-adapted nursery stock where appropriate.	[See entries in Table 63 under “Strategy 4: Enhance forest recovery following disturbance”]
Incorporate prescribed and cultural burning as well as the use of unplanned ignitions into land management practices, where appropriate.	[See entries in Table 63 under “Strategy 3: Reduce carbon losses from natural disturbance, including wildfire”]
Increase conservation and recovery efforts for at-risk plant and animal species in partnership with other Federal and State agencies and in consultation with Tribal governments.	FW-DC-SPEC-17: Forest Service actions provide ecological conditions that contribute to the recovery of threatened and endangered species, conserve proposed and candidate species, maintain viable populations of Species of Conservation Concern (SCC), and to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area.



Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
3c: Manage ecosystems for long-term change	
<p>Increase conservation and recovery efforts for at-risk plant and animal species in partnership with other Federal and State agencies and in consultation with Tribal governments. (continued)</p>	<p>FW-STND-SPEC-18: Collection of Species of Conservation Concern (SCC) shall be permitted for research, scientific, educational, cultural or conservation purposes only.</p> <p>FW-GDL-SPEC-19: To maintain viable populations of Species of Conservation Concern and contribute to recovery of federally listed species that are negatively affected by recreation and forest use, the Forest Service should manage human disturbance in pertinent habitats. Tools for managing use include: restricting use (motorized or non-motorized, including foot or pack stock traffic) to designated routes where appropriate; implementing seasonal recreation closures; and/or stipulating reauthorizations and new authorizations of pertinent special use permits.</p> <p>See all Plan Components related to Species of Conservation Concern, At-Risk Plants, and Federal Threatened or Endangered species (SPEC-20 through SPEC-52.e). Select examples include:</p> <p>FW-GDL-SPEC-31: To provide ecological conditions that contribute to the recovery of threatened and endangered plant species, conserve proposed and candidate plant species, and maintain viable populations of plant Species of Conservation Concern (SCC), new and reauthorized surface-disturbing activities (see glossary) should not occur within 600 feet of known locations of such plant species, within designated critical habitat for DeBeque phacelia, or within pygmy shrew habitat. For at-risk plant locations and/or specified habitat already located within 600 feet of surface-disturbing activities, map locations of at-risk plants to share with road crews and other applicable parties prior to maintenance work; use water only for dust abatement; do not seed, spray, or mow unless conducted as a restoration action specific to the at-risk species; avoid covering plants if grading road; and consider plant location during snow and ice control measures (Panjabi and Smith 2014).</p> <p>FW-DC-SPEC-33: Canada lynx populations and habitat in the national forests contribute toward range-wide species conservation and recovery, consistent with the best available scientific information (Lynx Conservation Assessment and Strategy or most recent conservation plan). Each lynx analysis unit contains a diversity of structural stages, stand initiation, stem exclusion, and understory reinitiation subalpine coniferous forest and mixed aspen-conifer stands. Regenerating conifer stands provides habitat for snowshoe hares. Spruce-fir stands impacted by spruce-bark beetles are regenerating. Lynx analysis units contain structural habitat diversity (uneven age classes) to support prey species.</p> <p>FW-DC-SPEC-36: Sagebrush ecosystems support the habitat needs of Gunnison sage-grouse and other sagebrush obligate species with a diversity of native grasses and forbs, appropriate habitat structure such as tall mature sagebrush to provide nesting and winter habitat, and lack of soil disturbance that allow them to resist invasion by and conversion to cheatgrass. Residual forb and grass production and ground cover, together with current year growth, provide vegetation suitable for nesting cover. Natural wet meadows and riparian habitats within the sagebrush landscape are resilient despite a changing climate....</p>



Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
3c: Manage ecosystems for long-term change	
Increase conservation and recovery efforts for at-risk plant and animal species in partnership with other Federal and State agencies and in consultation with Tribal governments. (continued)	FW-STND-SPEC-42: Surface-disturbing activities in designated critical Gunnison sage-grouse habitat shall incorporate reclamation measures or design features that accelerate recovery and native vegetation re-establishment of affected sage-grouse habitat, consistent with the best available scientific information.
Identify and protect climate refugia, such as coldwater streams and cool microclimates, as well as movement corridors for species migration.	<p>FW-GDL-RMGD-10.d: To minimize impacts on riparian ecosystems, install stream crossings that will be in place for more than one season in a manner that sustains bankfull dimensions of width, depth, and slope and keeps streambeds and banks resilient...</p> <p>FW-DC-ECO-03: Despite changing and uncertain future environmental conditions, ecosystems maintain all of their essential components and are resilient to climate change. Areas of rapidly changing climate support functioning ecosystems dominated by species native to the context area 13, though perhaps new to that specific location. Forestwide carbon stocks are resilient and appropriate to environmental conditions. Where necessary, management actions help to transition species composition and vegetation structure, including stand densities, to be resilient to modeled future climate conditions. Incursion of invasive species into new areas is minimal, and they are rapidly detected and removed. Areas of climate refugia are managed for resistance to climate change. Areas of climate refugia continue to support species historically present; have high ecological integrity, are resilient to future conditions, allow for species migration, and have low or no undesirable anthropogenic impacts.</p> <p>FW-OBJ-ECO-04: Within 5 years of plan approval, identify areas of potential climate refugia in the national forests and implement monitoring for a subset of these areas. For assisting identifying areas on the GMUG with high ecological value and relative climate stability, see Morelli et al. 2016, Dreiss et al. 2021, Conservation Science Partners 2021, or other best available science. See associated management approach.</p> <p>FW-MA-ECO-04.a: After climate refugia are identified, work with pertinent partners to develop area management actions such as those for conservation watersheds (OBJ-SPEC-54) and wildlife management areas (OBJ-WLDF-03). (Resistance)</p>

<sup>13</sup> As defined in the GMUG Terrestrial Ecosystems Assessment, the context area is 20 million acres surrounding and including the GMUG, delineated by ECOMAP subsections (Cleland et al. 2007).

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
3c: Manage ecosystems for long-term change	
<p>Identify and protect climate refugia, such as coldwater streams and cool microclimates, as well as movement corridors for species migration. (continued)</p>	<p>FW-MA-ECO-04.b: The following management approaches for climate-vulnerable ecosystems support the overall Climate and Carbon section, management approach FW-MA-CCC-01, as well as the management approaches in the Timber and Fuels sections. These are sourced from the cited best available science, and categorized according to the agency's "Resistance, Resilience, Transition" approach to climate adaptation. Note that plan direction throughout the plan supports these management approaches via desired conditions, specific objectives, standards, and guidelines.</p> <p><u>Alpine Ecosystems</u>: Identify, protect, and monitor areas where alpine vegetation is expected to persist (climate refugia); see FW-OBJ-ECO-04. Increase connectivity around habitat islands to promote movement corridors and ecosystem resiliency, with an emphasis on recreation management; see FW-OBJ-REC-04. (Resistance, Resilience)</p> <p><u>Alpine Ecosystems</u>: Consider management actions that maintain snowpack location and duration, given the impacts of reduced snowpack and warmer temperatures to distribution and abundance of plant species, changes in amount and timing of seasonal runoff, recreational access and use, and wildlife populations. (Resilience)</p> <p><u>Sagebrush Landscapes</u>: Identify and manage 1) areas of sagebrush habitat for at-risk sagebrush obligate species and 2) sagebrush refugia – areas where it is expected that sagebrush shrubland will persist under climate change. See FW-OBJ-ECO-04 and accompanying management approach. (Resistance)</p> <p><u>Spruce-Fir Landscapes</u>: Protect and monitor existing patches and linkage areas of spruce-fir forests to support at-risk species and rare species that are dependent on spruce-fir, including plants. (Resistance)</p> <p>FW-DC-ECO-05: Vegetation connectivity, configuration, and abundance provide for genetic exchange, maintain or enhance migration corridors for daily and seasonal movements of animals, including migratory pollinators, and predator-prey interactions across multiple spatial scales, including adjacent lands in the broader landscape. Habitat configuration and availability and species genetic diversity allow long-distance range shifts of native plant, wildlife, fish, and insect populations, in response to changing environmental and climatic conditions. Conditions provide for the life history, distribution, and natural population fluctuations of species within the capability of the ecosystem.</p>
<p>Help wildlife populations adapt to climate change by increasing redundancy and heterogeneity of habitat, decreasing other stressors, and improving connectivity.</p>	<p>FW-DC-AQTC-01: Physical (e.g., stream temperature, pool frequency, spawning habitat) and biological (e.g., large wood, overbank vegetation) conditions in aquatic ecosystems provide the habitat requirements for aquatic and semi-aquatic species, including native amphibians, native and desired non-native fishes, macroinvertebrates, and native plant and periphyton communities.</p> <p>FW-OBJ-AQTC-03: Within 5 years of plan approval, 1) identify areas critical to the conservation of native aquatic and semi-aquatic species (e.g., spawning areas and breeding habitat), 2) develop monitoring (e.g., for streambank stability), and 3) if desired conditions are not being met and causal factors are identified, apply conservation measures to ensure the long-term persistence of associated native aquatic and semi-aquatic species, and the population viability of at-risk aquatic and semi-aquatic species. See also the Forestwide objective RMGD-06.</p>

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
3c: Manage ecosystems for long-term change	
Help wildlife populations adapt to climate change by increasing redundancy and heterogeneity of habitat, decreasing other stressors, and improving connectivity. (continued)	<p>FW-STND-AQTC-05: The minimum and necessary new, replacement, and reconstructed crossings (culverts, bridges, and other stream crossings) and in-stream structures (impoundments, diversions, and weirs) on fish-bearing streams shall accommodate flood flows and allow aquatic organism passage (AOP), unless the accommodation would increase non-native species encroachment on native fish and amphibian habitat. Exceptions include temporary structures in place for less than one year. See also the Forestwide guideline for connectivity SPEC-06 and guidelines for instream infrastructure RMGD-10.d.</p> <p>FW-STND-RMGD-09: Do not authorize crossing fens with equipment. Exception: for over-snow crossing, see FW-GDL-RMDG-19.</p> <p>FW-GDL-RMGD-11: To minimize impacts on riparian ecosystems, authorizations for new water diversions and impoundments should require the infrastructure to be the minimum necessary and located and constructed such that their location and operation have minimal impact on the structure, function, composition, and connectivity of riparian management zones....</p> <p>FW-DC-SPEC-01: Forest management provides for native species persistence and movement within and among National Forest System parcels as well as adjacent lands in the broader landscape. Disturbance of species by management activities and recreation is managed to minimize impacts during critical life history periods (e.g., breeding, feeding, rearing young, and migrating), contributing to the persistence of native species. Ecological conditions sustain most common and uncommon native species...</p> <p>FW-OBJ-SPEC-03: During each 10-year period following plan approval, restore or enhance at least 50,000 acres of habitat. Priority treatment areas should include, but are not limited to, Wildlife management areas (MA 3.2), aspen, riparian areas, ecotones, winter range in pinyon-juniper communities, migration corridors and other connectivity areas, designated critical habitat, and other habitat for at-risk GMUG species....</p> <p>FW-DC-SPEC-12: Habitat blocks of sufficient size and quality exist across the landscape to support wildlife populations. Travel routes provide necessary access while maintaining relatively undisturbed high-quality habitat blocks—greater than 0.62 mile (1,000 m) from open motorized system routes and 0.41 mile (660 m) from open non-motorized system routes—sufficient in size to provide necessary security areas for populations of big game and other species. Relatively undisturbed migration and movement corridors exist across the landscape that provide sufficient security and habitat quality to allow for relatively unabated movement of big game and other species...</p>
3c: Manage ecosystems for long-term change	
Help wildlife populations adapt to climate change by increasing redundancy and	MA-DC-CRA-01: Colorado roadless areas encompass large, relatively unaltered and unfragmented landscapes characterized by high-quality scenery, soil, air, and water; diverse, native plant and animal communities;

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
heterogeneity of habitat, decreasing other stressors, and improving connectivity. (continued)	<p>functional, connected habitat for terrestrial and aquatic wildlife species, outstanding backcountry recreational experiences, and other roadless area characteristics, as defined at 36 CFR 294.41...</p> <p>MA-DC-WLDF-01: Large blocks of diverse habitat are relatively undisturbed by route and associated recreational use, providing security for the life history, distribution, migration, and movement of many species, including big-game species. Habitat connectivity is maintained or improved as fragmentation by routes is restricted...</p>
<p>Help wildlife populations adapt to climate change by increasing redundancy and heterogeneity of habitat, decreasing other stressors, and improving connectivity. (continued)</p>	<p>MA-STND-WLDF-02: To maintain habitat function and provide security habitat for wildlife species, there shall be no net gain in system terra routes, both motorized and non-motorized, where the system terra route density already exceeds 1 linear mile per square mile, within a wildlife management area boundary. New trail development within a wildlife management area unit should concentrate near existing development and avoid large blocks of unfragmented habitat to the extent feasible....</p> <p>MA-OBJ-WLDF-03: Within 5 years of plan approval, identify potential area-specific management actions for each wildlife management area to improve habitat connectivity and to achieve desired ecological conditions for constituent ecosystems. Within 10 years of plan approval, complete one action in each wildlife management area.</p> <p>MA-GDL-WLDF-04: To maintain long-term habitat connectivity and function within wildlife management areas, vegetation management in these management areas should be designed such that there is a long-term benefit to wildlife habitat, amongst other treatment objectives...</p> <p>MA-MA-SPEC-07.b: Coordinate with the Federal Highway Administration, Colorado Department of Transportation, Colorado Parks and Wildlife, other Federal land management agencies, local communities, and stakeholders to identify priority linkage areas (Beier et al. 2008; Hctor et al. 2007; Meiklejohn et al. 2010) and improve habitat connectivity, reduce wildlife-vehicle collisions, provide for aquatic organism passage, and increase highway permeability.</p>
4a: Help ensure the continued delivery of ecosystem services	
Target watersheds vulnerable to climate change for watershed restoration projects that improve the natural storage of water for municipal and agricultural uses.	FW-DC-WTR-01: Watershed conditions and the integrity of public water supplies are maintained or improved, and all watersheds achieve or are moving toward properly functioning condition as defined by the national watershed condition framework (or similar protocol).
4a: Help ensure the continued delivery of ecosystem services	
Target watersheds vulnerable to climate change for watershed restoration projects that improve the natural storage of water for	FW-DC-WTR-02: The Forest Service and a wide variety of partners actively coordinate to sustain ecological and hydrologic processes to continue to provide critical water supplies—including water quality— for ecological integrity and to communities and water users...

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
municipal and agricultural uses. (continued)	<p>FW-OBJ-WTR-04: The Forest Service and a wide variety of partners actively coordinate to sustain ecological and hydrologic processes to continue to provide critical water supplies—including water quality— for ecological integrity and to communities and water users...</p> <p>FW-MA-WTR-06: Coordinate across jurisdictions and consult applicable State municipal and source water protection plans prior to authorization of management activities that could affect public source water areas. (Resistance).</p>
Develop public-private partnerships to support the delivery of critical ecosystem services in the face of climate change.	<p>FW-MA-WTR-10: Consider applying a landscape- or watershed-scale approach to restoring aquatic and riparian ecosystems. Use partnerships and integrate restoration activities with other resource programs, especially recreation, range management, and vegetation management to efficiently use limited resources (Resistance, Resilience).</p> <p>FW-MA-FFM-05: Enhance relationships with municipal and agricultural water providers to ensure water use-related structures are considered in updates to Community Wildfire Protection Plans (CWPP) and wildland fire decisions.</p> <p>FW-MA-CHR-08: Develop and maintain collaborative partnerships with Tribes and other traditional communities, nonprofits, volunteers, professional organizations, and schools to assist the Forest Service in researching and managing its cultural resources. Encourage volunteer participation in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation.</p> <p>FW-MA-TMBR-12: Utilize partnership-based approaches, including stewardship contracts, to increase effectiveness and efficiency of vegetation management project planning and implementation. See associated management approach FW-MA-CCC-02 in the “Climate Change and Carbon” section regarding collaboration with local communities.</p>
4b: Support new and existing forest product markets that align with adaptation	
Work with industry and Tribal enterprises to support economically viable markets for wood products from salvage harvests and fuels reduction activities, including small-diameter timber and nontimber forest products...	FW-DC-TMBR-A Sustainable forest product yields contribute to local economies and are sufficient to support the desired pace and scale of ecological restoration and climate adaptation over the next several decades. A sustainable mix of forest products is offered under a variety of harvest and contract methods in response to market demand, restoration objectives, and climate adaptation.
4b: Support new and existing forest product markets that align with adaptation	
Work with industry and Tribal enterprises to support economically viable markets for wood products from salvage harvests and fuels reduction activities, including small-diameter	FW-MA-TMBR-13: Partner with local stakeholders and industry to innovate and support economically viable markets for both timber and nontimber forest products, including aspen, wood biomass, biochar, and small-diameter material (USDA Forest Service Climate Adaptation Plan 2022). Actively apply for agency funds dedicated to support emerging, alternative forest product markets (Resilience).

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
timber and nontimber forest products... (continued)	
Manage ecosystems to support the long-term sustainability of culturally and economically important nontimber forest products.	<p>Management Approach for Pinyon-Juniper Landscapes (ECO): Maintain land management practices that support sustainable human use of pinyon and juniper services, e.g., nut harvest and juniper posts. (Resilience)</p> <p>FW-OBJ-CHR-03: Within 5 years of plan approval, identify and map populations of oshá (<i>Ligusticum porteri</i>)</p> <p>FW-MA-CHR-06: Identify, evaluate, and protect areas identified as traditional cultural properties. Work with associated communities to collaboratively manage these areas.</p>
4c: Adapt recreation facilities and opportunities to sustain the recreation economy	
Support planning and actions to reduce the risks from climate change to trails, buildings, campsites, and other recreation infrastructure...	<p>FW-DC-REC-01: The GMUG provides a variety of high-quality, year-round recreation opportunities across a range of resilient recreation settings—from primitive to rural, and gradients between. Recreation opportunities and facilities (1) meet persisting and evolving needs of diverse user groups, (2) accommodate adjusted management as advancements in recreational equipment technologies make way for new and different uses, (3) are inclusive of a culturally diverse population, (4) are inclusive of populations historically under-represented in recreation use on the GMUG, (5) are accessible to persons with disabilities, wherever feasible and, (6) are adaptive to a changing climate, including increases in disturbances, warmer temperatures, changing hydrologic patterns, and other impacts. Unique cultural, historical, and ecological resources are featured through recreation opportunities, education, and interpretation, which connect visitors to the past, present, and future of the national forest landscapes.</p> <p>FW-OBJ-REC-04: Within 10 years of plan approval, enhance the resiliency of alpine ecosystems on at least 100 acres of GMUG lands by implementing recreation management plans and/or road and trail decommissioning...</p> <p>[See also entries in Table 64 below under “6d: Reduce risks and improve capacity in agency operations and infrastructure”]</p>
Develop adaptation actions that increase recreation accessibility and availability to disadvantaged communities.	FW-OBJ-REC-05: Within 10 years of plan approval, at a minimum of five recreation sites, improve design to meet the Forest Service Outdoor Recreation Accessibility Guide (FSORAG) or comparable direction. Over the life of the plan, meet accessibility guidance at all developed recreation sites.
4c: Adapt recreation facilities and opportunities to sustain the recreation economy	
Develop adaptation actions that increase recreation accessibility and availability to disadvantaged communities. (continued)	FW-GDL-REC-15: To support equitable recreational access for the general public while also promoting a diverse range of recreational opportunities, options to manage recreation events may be implemented, when needed, such as adjustments to the number, type, group size, duration, and/or timing of recreation events. The standard REC-07 will be applied to determine when thresholds have been reached and more active management is needed. Consideration should be given, but not limited, to the following aspects: (a) existing permittee compliance, (b) demand, (c) amount of displacement of the general visiting public, (d) consistency with desired

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
	recreation opportunity spectrum settings, (e) implications to travel management decisions, (f) observed social or biophysical impacts, (g) benefits to rural economies and tourism, and (h) community interest and/or concern....
4d: Take flexible approaches to manage grazing	
Increase flexibility in grazing management to allow for changes in the timing and intensity of livestock grazing.	FW-DC-RNG-01: Permitted livestock grazing on National Forest System lands contribute to the stability and social, economic, and cultural aspects of rural communities while maintaining or achieving desired ecological conditions, including the availability of forage for wildlife and regulating ecosystem services such long-term storage of carbon.
	FW-OBJ-RNG-03: At least annually, maintain ecological integrity and productivity of all ecotypes by evaluating allotment management with permit holders to adjust timing, intensity, duration, and frequency of livestock grazing when necessary to respond to changing ecological conditions or resource concerns such as drought, delayed snowmelt, extended forage season, wildfire, prescribed fire.
	FW-GDL-RNG-10: To allow desirable forage plants time to recover (grow) following livestock grazing and to retain sufficient vegetative stubble to provide cover litter and forage for wildlife and/or soil, grazing systems should be designed so that plants are generally not grazed more than once a season, not grazed the same time every year, and not during the entire vegetative growth period (season-long grazing), except where determined necessary to achieve or maintain desired ecological conditions.
Work with permittees to make range improvements (in fencing, water systems, and so forth) that enhance ecosystem adaptation to climate change.	FW-GDL-SPEC-06: To conserve wildlife and aquatic species habitat connectivity and restore natural hydrologic function, constructed features (e.g., exclosures, water developments fish barriers, range improvements, fences, roads, trails, and culverts) should be maintained to support the purpose(s) for which they were built and removed when no longer needed or modified to provide benefits to wildlife. New infrastructure should be designed to maintain, improve, or at a minimum reduce impacts to habitat connectivity, and as recommended by Colorado Parks and Wildlife (Hanophy 2009) and other best available scientific information...
	FW-OBJ-RNG-04: Within 10 years of plan approval, remove woven wire fencing in priority locations and where it is no longer needed (e.g., closed allotments, active or vacant cattle allotments unlikely to be converted to sheep allotments, within Gunnison sage-grouse critical habitat, to facilitate research, or forage utilization exclosures), after consulting with grazing permittees, GMUG resource specialists, and Colorado Parks and Wildlife to determine priorities and feasibility.
4d: Take flexible approaches to manage grazing	
Work with permittees to make range improvements (in fencing, water systems, and so forth) that enhance ecosystem adaptation to climate change. (continued)	FW-GDL-RNG-11.a: To maintain ecological integrity of streams, maintain the extent of stable banks in each stream reach at 74 percent or more of reference conditions per the Watershed Conservation Practices Handbook ((FSH 2509.25), or as consistent with other best available science.



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	FW-GDL-RNG-12: To minimize unintended wildlife impacts, range allotment annual operating instructions should require that new and updated livestock infrastructure incorporate best management practices in the Watershed Conservation Practices Handbook (FSH 2509.25), and as recommended by Colorado Parks and Wildlife (Hanophy 2009), e.g., installing wildlife escape ramps in troughs, designing ponds with a gentle slope to avoid entrapping animals, covering open-topped water storage tanks, wire spacing on fencing to avoid wildlife entrapment...
Work with permittees to make range improvements (in fencing, water systems, and so forth) that enhance ecosystem adaptation to climate change. (continued)	<p>FW-GDL-RNG-12.a: To maintain ecological integrity of springs and the ecological conditions for associated at-risk species, maintenance or improvement of existing spring developments should be prioritized over development of new springs. If new spring developments are necessary, springs that support at-risk species should not be selected for development.</p> <p>FW-GDL-RNG-13: To maintain quality and quantity of water flows to, within, or between groundwater-dependent ecosystems, spring developments should have spring orifices, points of diversion, pools, and lengths of runout channels protected (e.g., excluded with fences or barriers) from livestock trampling. Consider flow controls to limit the quantity of diverted water to that needed by the livestock. See supporting management approach FW-MA-RNGD-19. See also the Forestwide guideline for groundwater-dependent ecosystems RMGD-14.</p>
Restore and maintain native rangeland vegetation, where appropriate, especially species adapted to climate change	<p>FW-DC-SPEC-02: Forage availability is maintained or increased, where capable, and contributes to ecosystem resiliency and forage for native species and desirable non-native species, including livestock.</p> <p>FW-DC-SPEC-08: Composition and phenology of native plant communities provide floral resources and nesting sites and materials to support native pollinator species and allow effective pollination as an ecosystem service.</p> <p>FW-DC-RNG-02: Ground cover percentages by functional group (forbs, graminoids, shrubs, trees) in rangelands are within reference community ranges specified in the relevant Natural Resources Conservation Service Ecological Site Description.</p> <p>FW-DC-RNG-02.a: Where permitted livestock grazing has access to riparian areas, grazing of riparian species maintains those species, allows for vegetation regeneration, maintains bank and soil stability, and reduces the effects of flooding. Maintenance of woody riparian species leads to diverse age classes of woody riparian species where potential for native woody vegetation exists.</p>
4d: Take flexible approaches to manage grazing	
Restore and maintain native rangeland vegetation, where appropriate, especially species adapted to climate change. (continued)	FW-STND-RNG-07: Prior to authorizing grazing following wildland fire, restoration work, or seeding, Forest Service staff shall confirm range readiness on a case-by-case basis utilizing ecological condition, best management practices, desired conditions, and best available scientific information. Livestock use may be authorized for rehabilitation treatments (e.g., to prepare a site before seeding, incorporate seed and organic matter into the soil, remove noxious weeds, etc.).



Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
	FW-MA-RNG-21: Restore and maintain native rangeland vegetation, especially species adapted to climate change (Resistance, Resilience).
5b: Consult with Tribal Nations and establish strategic partnerships with disadvantaged communities	
Co-develop adaptation strategies in consultation with Tribal Nations and National Tribal Organizations and in partnership with organizations representing disadvantaged communities.	<p>FW-MA-AQTC-07: Consider the strategies and actions outlined in the Pathfinder Project Steering Committee Report (GMUG 2004), which support cooperation with Federal, State, Tribal, and local governments, and other stakeholders, regarding water flows to protect riparian resources, channel conditions, aquatic habitat, and associated recreational uses such as fishing and boating.</p> <p>FW-MA-SPEC-07.a: Communicate, collaborate, and cooperate with other agencies, Tribes, partners, and private landowners to encourage resource protection and restoration of ecological conditions that benefit wildlife, fish, and plants across ownership boundaries. Seek opportunities to work with other land managers and private landowners to improve connectivity to large contiguous blocks of habitat (&gt;500 acres).</p> <p>FW-DC-CHR-01: In coordination with Tribes, where sites are of interest to the Tribes; and/or in coordination with other local communities, for other sites: cultural resources are not only identified, protected, evaluated, and interpreted, but are also stabilized, rehabilitated, or scientifically studied for their information potential. In coordination with Tribes where applicable, cultural resources provide enduring, key ecosystem services, a sense of place and community identity, and/or—as appropriate—opportunities for heritage tourism.</p> <p>FW-OBJ-CHR-02: Within 5 years of plan approval, fire-sensitive cultural resource locations (including but not limited to historic structures, wickiups, and culturally modified trees) are identified in Heritage GIS to facilitate protective measures during wildland fire management.</p> <p>FW-STND-CHR-04: Fire-sensitive cultural resources (e.g., historic structures, wickiups, and culturally modified trees) shall be protected during prescribed fires, when feasible during wildland fires, or as requested by Tribes.</p>
5b: Consult with Tribal Nations and establish strategic partnerships with disadvantaged communities	
Co-develop adaptation strategies in consultation with Tribal Nations and National Tribal Organizations and in partnership with organizations representing disadvantaged communities. (continued)	FW-MA-CHR-08: Develop and maintain collaborative partnerships with Tribes and other traditional communities, nonprofits, volunteers, professional organizations, and schools to assist the Forest Service in researching and managing its cultural resources. Encourage volunteer participation in cultural resource conservation activities such as research, site stabilization, conservation, and interpretation.

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
	<p>FW-MA-CHR-11: Collaborate with Tribes and partners to identify priority cultural resources vulnerable to climate change and other stressors (e.g., increased recreation, vandalism). Identify the most vulnerable cultural and historic resources in Heritage Program GIS.</p> <p>FW-MA-CHR-09: Consider cultural resources as part of larger cultural landscapes as opposed to isolated phenomena.</p>
<p>Co-develop adaptation strategies in consultation with Tribal Nations and National Tribal Organizations and in partnership with organizations representing disadvantaged communities. (continued)</p>	<p>FW-MA-CHR-10: Incorporate effects from climate change into ongoing cultural resources research, planning, and stewardship, including identification of threatened or vulnerable cultural resources, cultural landscapes, and tribally important resources with focus on development of adaptation strategies.</p> <p>FW-MA-CHR-12: Increase protection of significant or vulnerable cultural resources by reducing vegetation adjacent to and within cultural resource boundaries, provided that appropriate protective measures are in place. If vegetation is only removed from the surrounding landscape through, for example, thinning and prescribed burning but is left untreated proximal to cultural resources, effects from severe fire, erosion, and livestock congregation can result in impacts to cultural resources. This management approach supports implementation of FW-STND-CHR-04.</p>
<p>6d: Reduce risks and improve capacity in agency operations and infrastructure</p>	
<p>Assess risks to agency infrastructure using vulnerability assessments and geospatial tools and reduce the risks through repair, replacement, or relocation.</p>	<p><b>FW-GDL-RMGD-10.b and -10.c:</b> To reduce the likelihood of sediment input to riparian management zones and reduce adverse effects to stream channels and riparian areas, the following activities should be avoided in riparian management zones:</p> <ul style="list-style-type: none"> <li>- new temporary roads and the construction of machine fireline,</li> <li>- new landings, skid trails, slash piles, burn piles, and staging or decking areas,</li> </ul> <p>Exception: 1) applicable only to streams, the minimum necessary for stream crossings or 2) those activities would contribute to attainment of aquatic and riparian desired conditions. <i>(More stringent direction is applicable to fens; see instead FW-STND-RMGD-09.b)</i></p> <p>FW-MA-INFR-08: Manage all Forest Service facilities according to the Facilities Master Plan.</p>
<p>6d: Reduce risks and improve capacity in agency operations and infrastructure</p>	
<p>Assess risks to agency infrastructure using vulnerability assessments and geospatial tools and reduce the risks through repair, replacement, or relocation. (continued)</p>	<p>FW-GDL-RMGD-10.e: To ensure that new permanent infrastructure is resilient to climate change and extreme weather events and to minimize impacts to riparian resources, new permanent infrastructure (including but not limited to campgrounds, designated dispersed recreation sites, trails, system roads) should be located outside of the 100-year floodplain. Exceptions: 1) the minimum necessary water-related infrastructure for the development of valid existing water rights; 2) the infrastructure is specifically designed to maintain or restore the riparian ecosystem; 3) minimum necessary crossings; and 4) minimum necessary culvert and bridge installation.</p>

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
	<p>FW-GDL-RMGD-10.f: To ensure that new permanent infrastructure is resilient to climate change and extreme weather events and to minimize impacts to riparian resources, design new permanent infrastructure (including but not limited to campgrounds, designated dispersed recreation sites, trails, system roads) that cannot be located outside of the 100-year floodplain with enough structural mitigation (e.g., deflection structures, flow devices and berms) to withstand 100-year-flood events. See supporting management approach FW-MA-RMDG-22 regarding interactions with beaver habitat.</p> <p>FW-MA-CHR-14: Develop management and preservation plans for administrative facilities and infrastructure that are significant cultural resources with special significance and/or are sites that receive heavy visitor use.</p>
	<p>FW-DC-INFR-02: Infrastructure is resilient to climate change and extreme weather events. See complementary management approaches FW-MA-INFR-09 and FW-MA-INFR-10.</p> <p>FW-OBJ-INFR-03: Every 10 years, complete one action in vulnerable and/or poor/impaired watersheds, as identified in the GMUG Watershed Vulnerability Assessment (USDA Forest Service 2013a) and the watershed condition framework ratings, to reinforce existing Forest Service infrastructure to withstand extreme weather events...</p> <p>FW-MA-INFR-09: To manage toward desired conditions for infrastructure that is resilient to climate change and extreme weather events (FW-DC-INFR-02), to implement actions to reinforce existing infrastructure to withstand such events (FW-OBJ-INFR-03), and to reduce the risks and negative impacts of uncharacteristic wildland fire to infrastructure (FW-OBJ-FFM-02), geographically prioritize actions, as informed by the GMUG Watershed Vulnerability Assessment (USDA Forest Service 2013a) (Resistance, Resilience). This assessment identified the following, in summary:</p>

Adaptation Actions and Supporting Activities (USDA Forest Service)	GMUG Forest Plan Direction
6d: Reduce risks and improve capacity in agency operations and infrastructure	
<p>Assess risks to agency infrastructure using vulnerability assessments and geospatial tools and reduce the risks through repair, replacement, or relocation. (continued)</p>	<ul style="list-style-type: none"> <li>Subwatersheds where transportation infrastructure and water use-related structures (dams, reservoirs, ponds, ditches, diversions) are most vulnerable are in the San Juans and Upper Taylor Geographic Areas (p. 106). Nine subwatersheds in the San Juans are rated as the most high-risk (339,700 acres); three subwatersheds encompassing an even larger area (476,900 acres) are identified as the most high-risk in the Upper Taylor Geographic Area (p. 110).</li> <li>Infrastructure construction and reconstruction in subwatersheds with high risk may need to be designed to handle higher flood levels or located in less vulnerable areas (p. 112).</li> </ul> <p>FW-MA-INFR-10: Apply best management practices identified in the Regional-Scale Climate Change Vulnerability Assessment for Infrastructure in the Rocky Mountain Region (USDA Forest Service 2015b), including, but not limited to:</p> <ul style="list-style-type: none"> <li>Size structures to match the morphology of streams, using the bankfull dimensions.</li> <li>While still appropriate to consider the 100-year flood level, the bankfull approach is a preferred approach in the context of a rapidly changing climate (p. 105) (Resilience).</li> </ul> <p><i>See also related plan direction FW-GDL-RMGD-10.e and FW-GDL-RMGD-10.f.</i></p>
<p>Reduce climate impacts from agency operations, including from facilities and fleet, while minimizing associated costs and advancing sustainable operations.</p>	<p>FW-DC-INFR-01: Safe, accessible, functionally efficient, aesthetically pleasing, energy-efficient, and cost-effective buildings and related facilities (owned, operated, occupied, or authorized by the Forest Service) needed to achieve resource management objectives are maintained or constructed; unneeded facilities are decommissioned.</p> <p>FW-MA-INFR-11: Sustainable Operations: To reduce the agency's environmental footprint, improve operational resilience, and save money and other vital resources, continue and expand sustainable operations. In coordination with regional and national efforts, strive to make measurable annual progress in energy conservation and renewable energy, water conservation, waste prevention and recycling, sustainable acquisition, sustainable fleet management, and sustainability leadership (Resistance, Resilience).</p>



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