United States Department of Agriculture
Forest Service

Jackson Mountain Landscape

Fuels Reduction and Vegetation Management Project

Environmental Assessment

Pagosa Ranger District, San Juan National Forest, Archuleta County, CO

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**Cover Photo: Field Trip with partners and USDA Forest Service personnel, Photo from Dana Gunn, June 2021*

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LIST OF COMMONLY USED ACRONYMS

APE	Areas of Potential Effect
BA	Biological Assessment
BE	Biological Evaluation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
DAU	Data Analysis Units
EA	Environmental Assessment
ESA	Endangered Species Act
FRCC	Fire Regime Condition Class
FS	Forest Service
FSH	Forest Service Handbook
GIS	Geographic Information System
GMU	Game Management Units
ID Team	Interdisciplinary Team
LRMP	Land and Resource Management Plan (also referred to as Forest Plan)
MA	Management Area
MSO	Mexican Spotted Owl
NEPA	National Environmental Policy Act
NFS	National Forest System
NFSR	National Forest System Road
NFST	National Forest System Trail
NHPA	National Historic Preservation Act
OHV	Off Highway Vehicle
SHPO	State Historic Preservation Office
SJNF	San Juan National Forest
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

1 Background and Need for Action

1.1 Background

Jackson Mountain is a hub of activity: multiple forms of recreation and active vegetation treatments pointed to a need for a broadscale, landscape level analysis to address future management goals and activities. The Forest Service engaged stakeholders, partners, the public, and internal resource specialists starting in the summer of 2021 in order to identify prominent issues, concerns, and opportunities for improvements in the Jackson Mountain area.

The need for a sustainably designed trail system was initially identified, as well as the need to improve forest health and resiliency, reduce fuels, restore ponderosa pine forest structure, increase age-class diversity of Gambel oak, enhance meadows, and regenerate aspen stands currently in decline. Archuleta County also expressed interest in opening a non-commercial gravel pit in the Jackson Mountain area to provide a local source of material for use on county and Forest Service Roads.

Initial scoping for the project was undertaken in January and February of 2023. Numerous comments were received during scoping, primarily relating to the proposed gravel pit and recreational trail system. After a thorough review of public, agency, and internal comments, the district decided to move forward with the fuel reduction and vegetation management portions of the project. This includes thinning, mastication, and tree removal intended to help improve forest health and resiliency across the landscape, reduce fuels, and regenerate aspen stands currently in decline.

For the gravel pit and trail system portions of the project, after review of the scoping comments and further discussions with partners, the District decided not to move forward with the gravel pit or trail system as part of the environmental analysis at this time. These projects may be considered separately after further public involvement and additional field work to determine the best locations for these activities.

1.2 Analysis Area

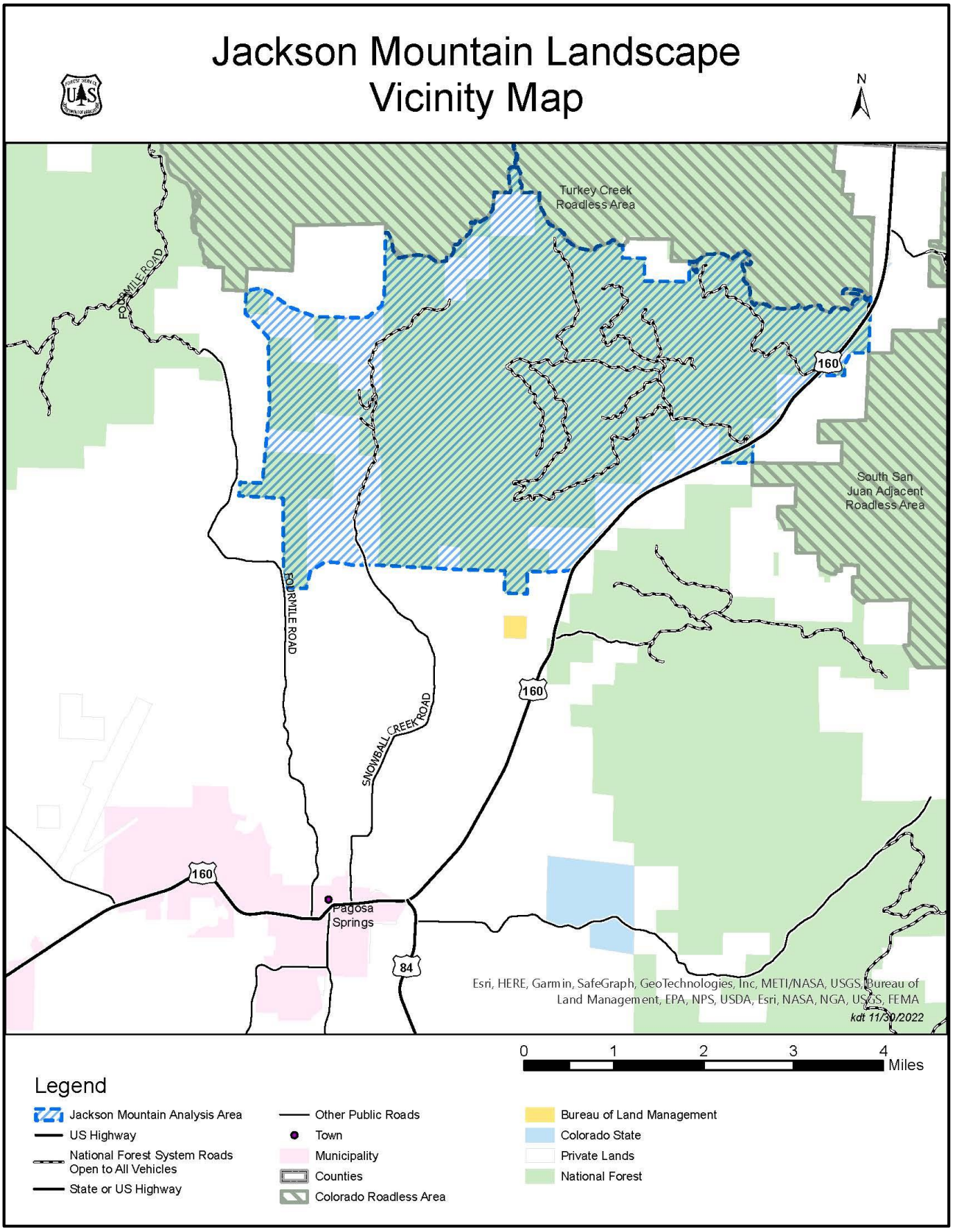
The Jackson Mountain analysis area includes approximately 9,390 acres east of Pagosa Springs and north of the San Juan River Village subdivision in Archuleta County. The San Juan River Village subdivision is listed in the Archuleta County Community Wildland Fire Protection Plan as a high-risk area. The elevation of the analysis area ranges from 7,263 to 8,890 feet. Figure 1 displays the location of the Jackson Mountain analysis area.

1.3 Purpose and Need for Action

The purpose of the proposed project is to:

- Increase opportunities for safe and effective wildland fire management and reintroduction of fire into forest ecosystems
- Promote diversity in forest structure and composition that provides resilience to disturbances such as wildfire, drought, and forest insects and disease
- Promote conditions that provide for long-term wildlife habitat sustainability
- Provide wood and forest products for both commercial and non-commercial uses

Figure 1: Jackson Mountain Landscape Vicinity Map



The need for the proposed action is to manage forest vegetation to move current and foreseeable future conditions closer to desired conditions (DCs) on landscapes available for active management. Relevant desired conditions described in the 2013 San Juan National Forest Land and Resource Management Plan (Forest Plan), as amended in 2021 include: having all development stages of forested ecosystems well represented at the landscape scale and occurring within specified ranges (DC 2.2.6), providing resilient terrestrial ecosystems (DC 2.2.9), offer resistance and resilience to weather, insects and disease outbreaks (DC 2.2.15), meeting needs or demands for forest product offerings (DC 2.9.1), and having defensible space and dispersed patterns of fuel conditions that favorably modify wildfire behavior and reduce the rate of wildfire spread in and around communities at risk (DC 2.11.5).

1.4 Overview of Proposed Action

Proposed fuels reduction and vegetation treatments include mastication, thinning, and tree removal intended to help reduce fuels, improve forest health and resiliency, and regenerate aspen stands currently in decline. Fuels reduction and commercial forest product removal treatments would be designed to help improve wildlife habitat in the project area. Reforestation and road related activities associated with these treatments are also proposed.

The proposed action incorporates approaches and design elements that would produce wood products, maintain and promote structural complexity in these forests and the larger landscape over time, and make them more resilient to disturbances. Proposed harvests would take place in areas of the Forest intended for regularly scheduled commercial harvests to produce forest products, and other areas where harvests can be used to move vegetation towards Forest Plan desired conditions.

1.5 Conformance with the Land and Resource Management Plan

Forest Plan Direction

The San Juan National Forest (SJNF) is broken into discrete Management Areas (MAs). MAs describe the intensity of management that can be expected within an area, provide a general sense of how the landscape will appear, and identify uses and activities that are allowed. The Jackson Mountain analysis area falls within four different management areas: 338 acres in MA 3 (Natural Landscapes with Limited Management), 150 acres in MA 4 (High-Use Recreation Emphasis), 5,983 acres in MA 5 (Active Management), and 2,919 acres in MA 7 (Public and Private Land Intermix). The ID Team reviewed Forest Plan direction and determined that the proposed action complies with the 2013 San Juan National Forest Land and Resource Management Plan (Forest Plan), as amended in 2021 (USDA FS 2021). Figure 2 shows management area designations within the Jackson Mountain analysis area.

Timber Suitability

Within the Jackson Mountain analysis area there are approximately 4,797 acres of land considered suitable for timber production, 1,594 acres considered tentatively suitable, and 2,999 acres considered generally not suitable for timber production or harvest. Suitable timberlands are managed for a regularly scheduled timber harvesting program and tentatively suitable lands are managed for an irregular, unscheduled timber harvesting program. On tentatively suitable ground, timber harvest may occur for multiple-use objectives other than timber production, and commercial harvest is generally precluded or limited to only the salvage of dead trees. Limited timber cutting is allowed on lands considered not suitable, for purposes such as salvage, or protection or enhancement of wildlife habitat, scenic-resource management, or research or administrative studies consistent with Management Area direction (Forest Plan Standard 2.9.122). Figure 3 shows timber suitability designations in the Jackson Mountain analysis area.

Figure 2: Management Areas in the Jackson Mountain Analysis Area

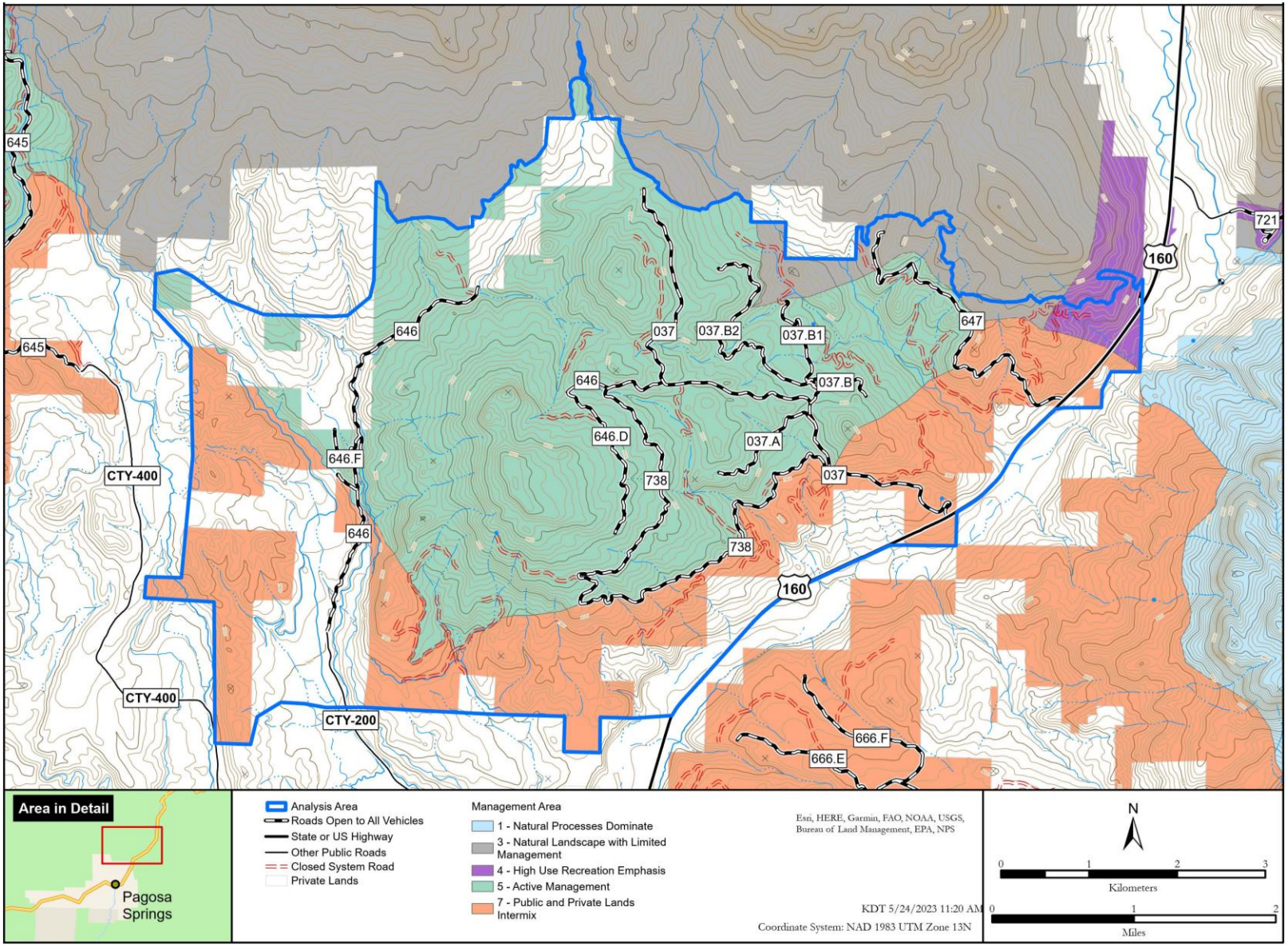
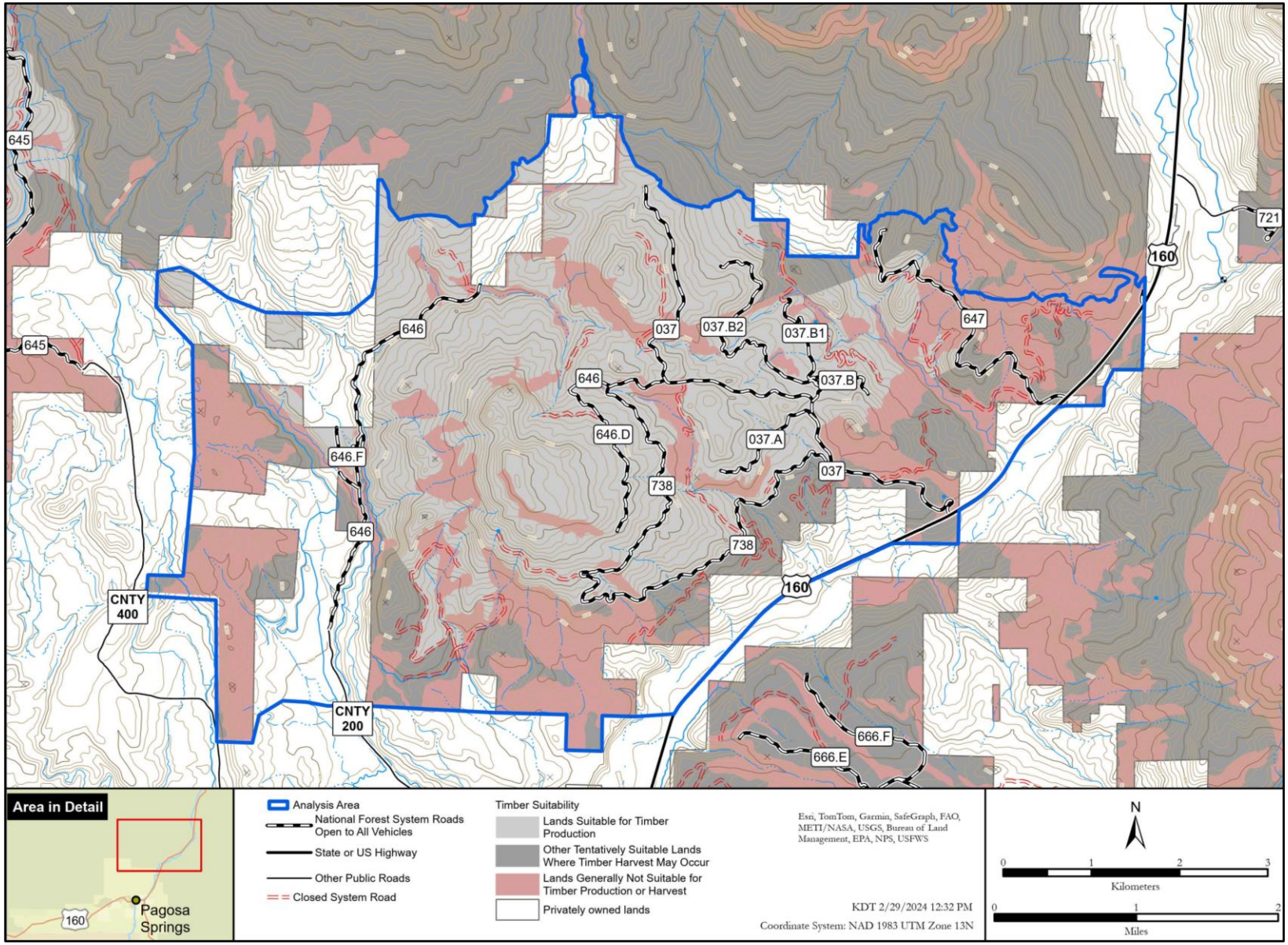


Figure 3: Timber Suitability in the Jackson Mountain Analysis Area



1.6 Public Involvement

Pre-scoping outreach efforts started in January 2022 and continued until January 2023. Outreach efforts included meetings and field trips with partners and stakeholders, an in-person public open house, a virtual open house, and posting various information to the project website including a StoryMap giving a preliminary description of the project. The scoping period started on January 10, 2023 and ended on March 6, 2023. Scoping letters were sent to landowners in the adjacent San Juan River Village subdivision, Archuleta County representatives, the San Juan Headwaters Forest Health Partnership, local recreation groups, and other interested groups and members of the public. The proposal was listed in the Schedule of Proposed Actions on January 10, 2023, and a press release describing the project and announcing the scoping period was provided to local media on January 10, 2023. As a result of the scoping effort, input was received from 373 interested parties. This input, along with input received from Forest Service resource specialists, was considered in Section 1.7 below and the formulation of the alternatives described in Chapter 2.

1.7 Issues

Issues serve to highlight the effects or unintended consequences that may result from an action, giving opportunities during the analysis to reduce adverse effects and to compare trade-offs between the alternatives. Issues were raised by both the public during the scoping period, and by the Interdisciplinary (ID) Team working on the analysis of potential effects related to the proposed action.

All comments submitted during scoping were reviewed by the ID Team and the Deciding Official. The ID Team used information from the scoping process to identify issues related to the initial proposal. These issues drove the development of the proposed action and focused the scope and extent of the analysis of environmental effects. Minor issues also helped to focus the scope and extent of the effects analysis. Other issues were identified as being outside the scope of the proposed action; already decided by law, regulation, Forest Plan, or other higher-level decision; irrelevant to the decision to be made; or conjectural and not supported by scientific or factual evidence. The minor issues and other issues were excluded from detailed analysis but are tracked as part of the project record. The following issues were identified from comments received during the scoping period and input from the ID Team:

Issue 1: Gravel Pit

Numerous comments were received related to the development of a gravel pit in the Jackson Mountain area. Some comments were supportive of the need to develop gravel resources closer to the community of Pagosa Springs while other comments expressed concern about developing a gravel pit on Jackson Mountain. Concerns included potential impacts to residents in the nearby San Juan River Village subdivision, concerns about impacts of gravel truck traffic on the Jackson Mountain road, impacts to other users of the road, concerns about impacts of gravel pit development on natural resources, and concerns that Jackson Mountain is not the best place for a gravel pit.

After review of the scoping comments and further discussions with partners, the District decided not to move forward with the gravel pit as part of the environmental analysis at this time. A gravel pit may be considered separately after further public involvement and additional field work to determine the best location for a gravel pit.

Issue 2: Trail System and Related Facilities

Numerous comments were received related to the development of a trail system, parking areas, and toilets in the Jackson Mountain area. Comments in support noted that use is already occurring in the area and that trails have a positive socio-economic impact. Comments not in support of a trail system expressed concerns that adopting user created trails creates a bad example and encourages further trail creation in the hopes of the trails being adopted by the Forest Service. Concerns over how a trail system would impact to elk and deer habitat were also raised. There was particular concern over trail users causing widespread and long-term disturbance with potentially negative impacts to migration corridors.

After review of the scoping comments and further discussions with partners, the District decided not to move forward with the trail system as part of the environmental analysis at this time. A trail system may be considered separately after further public involvement and additional field work to determine the best locations for a trail system of the type originally proposed on Jackson Mountain.

Issue 3: Type of Vegetation Management and Fuels Reduction Treatments

Comments were received on a variety of topics related to the type of treatments that are being proposed. Most of the comments received were supportive of the need to reduce fuels to facilitate safe and effective wildland fire management, as well as supporting the vegetation management goals and need to provide wood products. Some commenters had preferences or suggestions about what types of treatments should be done, stating their preference that we should only use prescribed fire because they felt mechanical thinning such as mowing and mastication do not mimic natural processes and can have a negative impact on soils and vegetation on sloping land. They also suggested that mechanical fuels reduction should only be used very near roads, trailhead, and other access points to protect the built environment.

These comments were considered in the development of the proposed action, however, while prescribed fire is an important management tool, its sole use would not meet the purpose and need of this project. One of the purposes of this project is to treat vegetation to increase opportunities for safe and effective wildland fire management and reintroduction of fire into forest ecosystems. Mechanical treatments and harvests are more precise, predictable and reliable at reducing fuels than prescribed fire, which is highly effective, but often limited operationally by favorable burn windows, resource availability and smoke constraints. Pre-treatment of ladder fuels, harvest in adjacent forests and the establishment of less hazardous fuels conditions across a large analysis area will increase the predictability of burn effects on vegetation and reduce the chances for unforeseen or undesirable burn effects, thus increasing opportunities for safe and effective wildland fire management and reintroduction of fire into forest ecosystems. Without the proactive treatment of vegetation through mechanical means, it is far less likely that the Jackson Mountain area would be prioritized for prescribed fire as implementation would involve higher risks and desired outcomes would be more difficult to attain. Additionally, the proposed harvest of forest products on lands suitable for timber production (as defined in the Forest Plan) meets Forest Plan desired conditions and the purpose and need of this project. Consideration of impacts from mechanical treatments on slopes was considered and specific design elements are included as part of the proposed action.

Issue 4: Resource Impacts

Wildlife: Concerns over how project activities may impact wildlife were raised, including concerns about forest and understory thinning reducing cover for elk, and concerns about fuels treatments reducing available forage for wildlife. Design elements intended to minimize impacts to wildlife habitat are included in the proposed action.

Old Growth/Old Trees: Some commenters expressed concern about the loss of old and/or large trees that may be harvested. Trees within the analysis area range in age from a few years to hundreds of years. Old trees established prior to Euro-American settlement of the area in the late 1800s are found in relatively low densities throughout the analysis area. These trees are fire resistant, provide important tree age diversity, and wildlife habitat. These legacy trees are a focus for retention during treatments, and as stated in Section 2.2, live green ponderosa pine trees or Douglas-fir trees older than approximately 140 years in age will be retained with very rare exceptions. This is further described in Section 2.2.

2 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.1 Alternative 1 – No Action

Under Alternative 1, there would be no change to current management in the analysis area. Dispersed personal use or limited commercial permitting would be expected to continue at current levels. Personal and commercial permitting includes the gathering and utilization of a variety of forest products such as fuelwood. Remaining work associated with the 2008 Pagosa Area Long Term Stewardship Contract would also occur. Similarly, typical road maintenance activities associated with open National Forest System Roads would continue. Other activities such as recreation use, fire management, livestock grazing, and operation and maintenance of power lines would continue to occur.

2.2 Alternative 2 – Proposed Action

Fuels Reduction Treatments and Associated Activities

Fuels reduction treatments are proposed on approximately 1,600 acres in the ponderosa pine, warm-dry mixed conifer, and shrub dominated sites across the Jackson Mountain area. The purpose of the treatments would be to reduce shrubs and small trees that act as ladder fuels which can transition a fire from the forest surface to the crowns of trees. Fuels adjacent to open roads and private land would be targeted to create buffers to allow for increased control options and public and firefighter safety in the event of a wildfire. This would have the additional benefit of increasing site distances for vehicles on highly trafficked roads. Slash from thinning operations may be piled, dispersed or chipped and the boles of trees may be available to the public for fuelwood. Treatment may occur any time of the year but would most likely occur between April and November and would be a mix of mechanized treatments (i.e. mowing, mastication, chipping, etc.) and hand thinning with public fuelwood removal. More than one type of treatment may occur in the same area and treatments may require more than a single entry to meet treatment goals. The proposed treatments may be implemented through a variety of means including but not limited to hand thinning, service contracts, stewardship contracts, and small product permits (such as post and pole permits or firewood permits). Figure 4 on page 16 shows a map of the areas proposed for fuels reduction treatments.

Commercial Forest Product Removal and Associated Activities

Commercial forest product removal is proposed on up to 900 acres. Of this acreage, approximately 700 to 800 acres would focus on commercial timber harvests with the remaining 100 to 200 acres focusing on meadow enhancement. Stands within the project area were largely harvested during the 1970's and overall, the landscape lacks stand age diversity.

Across all stands and treatments, live old ponderosa pine and Douglas-fir established prior to approximately

1880 would be retained in nearly all situations during planned harvest. Exceptions for safety reasons, to reduce declining trees with severe dwarf mistletoe infestation, root rot or bark beetles may be made in rare instances. Old-aged trees will be identified using a combination of physical characteristics[1]:

- Large diameter relative to other trees in the localized area
- Large diameter branches
- Irregular crowns, flat tops
- Tall height and canopy position
- Bark thickness, color and pattern

When a determination of tree age cannot be made using physical characteristics, these trees would either be retained (particularly in low productivity areas) or assessed and documented at the harvest-unit scale to ensure old-aged trees are retained (typically in higher productivity areas and/or where these trees may be present in high densities).

All commercial timber harvests would occur on lands identified in the Forest Plan as suitable and tentatively suitable for timber production. Work would be accomplished with a mix of Forest Service or conservation crew resources, timber sales, thinning service contracts and/or commercial fuelwood permits. In accessible areas, wood will continue to be made available to the public for removal under personal fuelwood collection permits.

Dynamic thinning and regeneration treatment is focused on adding age class diversity across the landscape while favoring the regeneration of ponderosa pine, Douglas-fir, and aspen. A combination of treatments would be used based on species presence and stand conditions with an effort to blend the different methods across the treatment area. Generally, the treatments would fall into the following four categories:

- *Mixed conifer with relic ponderosa pine and Douglas-fir in the overstory* – Focus on promoting new areas of young ponderosa pine and Douglas-fir by retaining these trees as seed sources and removing competing trees generally within one tree length of the seed tree. Figure 5 shows an example of this type of stand.
- *Ponderosa pine, Douglas-fir and white fir areas with younger age classes* – These areas would be thinned to improve forest health. Thinning would favor the retention of ponderosa pine and Douglas-fir where found.
- *White fir areas with declining health* – In these areas, a partial harvest would retain moderate levels of canopy trees while allowing for regeneration of this shade tolerant tree.
- *Aspen Stands* – In areas where there are relatively pure aspen stands, harvests would focus on creating new age classes of aspen. The focus would be to create openings that have the light levels needed for regeneration of aspen. Timing, spatial distribution and size will be important to mitigate deer and elk browsing observed in the project area. Figures 6 and 7 shows an example of this type of stand.

Some areas interspersed within the proposed units would not receive treatments. This can be for resource protection requirements, equipment operability limitations, or areas where treatment would not move the stand toward desired conditions.

[1] A recent study of tree characteristics and age completed in northern Colorado found using a combination of physical characteristics was more reliable than using a single characteristic such as diameter. This study found that physical characteristics were 88% to 96% accurate in identifying old (>~150 years old) Douglas-fir and ponderosa pine trees (Brown et al. 2019)

There is one ponderosa pine dominated unit proposed for treatment. This unit is located on the far western portion of the project area, located off of NFSR 646B. This stand is dominated by young ponderosa pine with scattered groups of large, old trees and a sparse understory. The removal of single trees or groups of single trees would improve the health of this stand while not changing its character. Harvest would occur across all size classes and ages with the exception of the large old trees.

Meadow enhancements treatments would occur in two areas within the Jackson Mountain landscape. Past management activities, particularity fire suppression, have led to encroachment of forest into areas that were formerly dominated by grasses and forbs with only a few scattered trees. To maintain diversity of forest and non-forested area across the landscape, treatments would focus on removal of trees encroaching into meadow edges, particularly where soils would have supported a grass forb layer in the past. Large, old ponderosa pine, Douglas-fir and young, vigorous aspen clumps would be favored for retention due to their fire resilience.

Reforestation

Reforestation may be done to promote recovery of forest vegetation following harvest. Recent harvests have resulted in natural regeneration of young conifers and aspen, so widespread tree planting is not expected following completion of harvest. If natural regeneration of desirable species does not meet goals, follow up treatments may be employed such as broadcast burning, scarification, supplemental planting, and protection of Douglas-fir seed sources with Methylcyclohexanone (MCH) to discourage insect mortality. Additionally, some planting may be required in areas of high heavy equipment impacts such as log landings and log skidding trails and/or as a measure to discourage use of these or other rehabilitated areas. All reforestation would be completed using locally adapted seed sources. To promote seedling survival, localized removal of competing vegetation around planted trees using hand tools or mechanized equipment may be required.

Road and Trail Related Activities

Roads proposed for use during project activities are shown in Figure 4 on page 16. There may be some temporary trail or road closures during certain fuels reduction activities such as mastication operations.

Road Maintenance: The majority of road work would be maintenance-related, and would be performed prior to, during, or following treatments. Most of this work would involve reshaping and grading of the road surface, replacement of culverts as needed, and maintenance of associated ditches, culverts, cattleguards, or rolling dips.

Existing Road Reconstruction: Reconstruction would improve roads that would be used by contractors and purchasers, visitors, and Forest Service personnel. Spot reconstruction is expected on closed system roads throughout the project area and may involve installation or replacement of culverts or other drainage features, or excavation to repair degraded road grades.

Temporary Road Construction: Some temporary road may be needed to remove logs from harvest areas. There are many National Forest System Roads in place throughout the landscape and most contractors will prefer to use and maintain only these roads, but some may prefer to build sections of temporary road rather than skid or drag logs a longer distance to system roads. This preference varies based on the harvest conditions and the type of equipment used by individual forest contractors. If a contractor elects to build temporary roads, a maximum of 6 miles could be expected to be built in order to complete logging and hauling operations across the project landscape. The exact locations and lengths of temporary road segments would be determined through agreement between the Forest Service and timber purchaser. All temporary road segments would be closed to wheeled motorized use by the public during operations and would be obliterated and permanently obstructed following operations.

Snowplowing: Snowplowing would be allowed throughout the winter season on all roads throughout the analysis area.

Other Activities Associated with Tree Cutting and Removal

Slash Disposal: Logging slash less than 6 inches in diameter would either be piled and burned or removed in ponderosa pine and dry-mixed conifer harvests. Logging slash less than 6 inches in diameter in aspen and cool-moist conifer stands may be either piled and burned, or lopped and scattered depending on local stand conditions and species composition. Logging slash may be offered as a biomass product for removal in harvest contracts. Slash and cull wood greater than 6 inches in diameter would either be removed, scattered throughout harvested stands, or decked at landings adjacent to system roads for public fuelwood removal.

Sale Area Improvement: Available funding derived from timber product receipts may be used to finance some combination of the following sale improvement activities:

- Noxious weed control using Integrated Pest Management concepts and in compliance with the SJNF Noxious Weed Management Plan and the Forest Plan. The primary noxious weeds of concern are Canada thistle, musk thistle, yellow toadflax, leafy spurge, and oxeye daisy.
- Installation of gates or other restricting devices on roads to remain closed to wheeled motor vehicles.
- Removal of closure gates and permanent closure of roads after temporary gate needs have been met.
- Erosion control, maintenance and/or improvement to system roads and trails.
- Site preparation for reforestation or rearrangement of slash or non-commercial tree material to facilitate reforestation.
- Purchase of tree seedlings, planting activities and reforestation surveys.
- Improvements to stock ponds or other livestock control and management infrastructure.

2.3 Design Elements

The following design elements apply to the Proposed Action.

Vegetation/Noxious Weeds

- Prior to project activities, inventory and treat priority weed infestations within the project area as time and funding allow.
- Off-road equipment must be cleaned before entering National Forest System lands and prior to moving between weed-infested areas to weed-free areas. Remove mud, dirt, and plant parts from project equipment before moving it into the project area. This does not apply to service vehicles traveling frequently in and out of the project area that will remain on system roads.
- New infestations of noxious weeds identified by either the Forest Service or operators will be promptly reported to the Forest Service to ensure that treatment can occur. Noxious weeds shall be treated following termination of project activities. Generally, after the second year of treatment, monitoring will determine the need for subsequent treatments.
- When moving equipment during operations, use existing gates before creating new ones where feasible.
- Range permittees operating within the analysis area should be informed well in advance of any potential disruptions to their operations.

Wildlife and Fisheries

- **Elk Production Areas** - Disturbance impacts to elk production areas will be minimized with application of seasonal restrictions during elk calving seasons (May 15 to June 30). Project activities will be limited or avoided during this period (Forest Plan 2.3.59).
- **Elk winter concentration areas and severe winter range** - Disturbance impacts to elk winter concentration areas and severe winter range habitat will be minimized with application of seasonal restrictions during the winter period (December 1 to April 30). Project activities will be limited or avoided during this period (Forest Plan 2.3.60).
- **Raptors** - A wildlife biologist will train personnel involved in project preparation, layout, and administration in forest raptor biology and nest identification. The biologist shall be notified immediately if raptor nests are discovered to determine the status of breeding activity. The biologist will determine which activities should be limited or avoided during the breeding seasons in compliance with Forest Plan raptor protection measures (Forest Plan 2.3.49).
- **Snags** (Forest Plan 2.283)
  - To meet the desired conditions in **ponderosa pine forests**, leave a minimum of 1 snag per acre of at least 15 inches in diameter at breast height and 25 feet tall. If trees in this size class are not available, then leave 2 to 3 snags per acre of at least 9 inches diameter at breast height and 25 feet tall.
  - To meet the desired conditions in **warm-dry mixed conifer forests**, leave a minimum of 1 to 2 snags per acre of at least 15 inches in diameter at breast height and 25 feet tall. If trees in this size class are not available, leave 3 to 5 snags per acre of at least 9 inches diameter at breast height and 25 feet tall.
  - To meet the desired conditions in **cool-moist mixed conifer forests**, leave a minimum of 2 to 3 snags per acre of at least 15 inches in diameter at breast height and 25 feet tall. If trees in this size class are not available, leave 5 to 10 snags per acre of at least 9 inches diameter at breast height and 25 feet tall.

Watershed and Soils

- Operate heavy equipment only when soil moisture is below the plastic limit or protected by at least 12 inches of packed snow or 2 inches of frozen soil. Soil moisture exceeds the plastic limit if the soil can be rolled into 3 mm threads without breaking or crumbling (FSH2509.25 Chapter 10 management measure 14.1 Design Element 1b).
- At least 10% of treatment generated slash should be left on site, distributed throughout the treatment units.
- Mechanized equipment is restricted from operating on sustained slopes of 40% or greater.
- Stream course protection provisions will be applied to drainages for vegetation treatment operations. Stream course protection measures are defined in standard timber sale contract provisions. These measures would be implemented regardless of the contracting method used.
- Mechanized equipment is prohibited in buffer zones around streams and wetlands during treatment operations. No-equipment buffer zones do not apply to designated stream crossings. Buffer zones are defined as follows unless otherwise determined by a hydrologist:
  - Intermittent and perennial streams (based on National Hydrography Dataset) – 100 feet on each side;
  - Laughlin park wetland – 100 feet around perimeter of meadow as mapped by hydrologists during 2021 fieldwork;
  - Ephemeral drainages – 25 feet each side of the drainage to be identified prior to implementation.
- Stream course, wetland, spring, and water influence zone buffers will be clearly marked within the

treatment units prior to operations.

- Skid trails will be located perpendicular to slope angles (along the contour) as much as possible. Avoid creating a dendritic runoff pattern. Do not skid up and down drainage bottoms. As needed, install waterbars or outslope and spread slash on skid trails upon completion of use.
- Proper drainage will be constructed or reconstructed on existing and temporary roads that would be used during vegetation treatment operations. Road-stream crossings and dips through habitually wet areas on Forest Service roads open to motorized public use would be hardened. All drainage structures on roads would be inspected at the completion of the project to make sure they are in good condition and functioning properly. Blading roads that are currently well vegetated with grass would be minimized as much as possible.
- Mechanized equipment within stream courses will be prohibited except to cross at designated stream crossings. Limit stream crossings to the minimum number necessary and cross perpendicular to the direction of flow. Do not cross streams if banks exceed 30% slope.
- Do not encroach road fill or introduce soil into streams, swales, or wetlands during implementation of any proposed projects.
- Keep log landings and skid trails out of Stream Management Zones, swales, and parks.
- Locate and construct log landings in such a way to minimize the amount of excavation needed and to reduce the potential for soil erosion. Design landings to have proper drainage.

Measures for reclamation

- Decompact log landings and disperse runoff to prevent surface erosion and encourage revegetation using slash and seeding.
- Entrances to Level 1 roads from USFS Level 2 and 3 roads will be closed either by installing a gate, constructing a berm or obliterating the entrance (i.e. recontouring the first few hundred feet, use of slash, etc.) or a combination of berm and obliteration methods.
- Upon closure, provide stable drainage on Level 1 roads that disperses runoff into filter strips and maintains stable fills at the recommended spacing for the soil type (Watershed Conservation Practices Handbook 2509.25, Management Measure 13.3).
- Temporary roads will be decommissioned and obliterated within five years in the following manner:
  - Remove any culverts and temporary crossings (including fill material) placed at stream crossings and restore the channel geometry and revegetate the channel banks.
  - Decompact the road surface to a minimum of six inches. If a gravel base exists; scarify or rip the gravel, crushed stone, or other nonrigid surface, base, and subbase material. Mix the scarified or ripped material with the underlying soil. Bury the mixture under at least 12 inches (300 millimeters) of soil.
  - Provide stable drainage that disperses runoff into filter strips and maintains stable fills at the recommended spacing for the soil type (Watershed Conservation Practices Handbook 2509.25, Management Measure 13.3).
  - Establish effective ground cover on disturbed sites to prevent accelerated on-site soil loss and sediment delivery to streams. Restore ground cover by seeding and avoid persistent or invasive exotic plants.
  - Seed all disturbed soils after ripping, weather and soil conditions permitting. If the soil surface is crusted, take appropriate measure to break up the crusted areas prior to seeding.
  - Salvaged woody debris (slash) should be applied to disturbed surfaces where possible.
  - Temporary roads that were constructed using cut and fill practices will be restored to natural slope

contours in the Snow Springs area on the west side of the analysis area.
    - Entrances to temporary roads from USFS Level 2 and 3 roads will be closed either by berm or obliterating the entrance (i.e. recontouring the first few hundred feet, use of slash, etc.) or a combination of methods.
- A careful review of erosion prevention work will be made by the timber sale administrator before each harvest unit is accepted as final. The inspection will determine if the work is acceptable and will meet the objective of the erosion control feature. Work is not acceptable if it does not meet standards or is not expected to protect soil/water values.

Recreation

- Areas receiving active treatments (mastication, felling, skidding, hauling, etc.) must be clearly signed from numerous access points to mitigate potential safety concerns.
- Special use permittees (Outfitter/Guides) operating within the analysis area should be informed well in advance of any potential disruptions to their operations.
- ML1 and temporary roads should be monitored for unauthorized motorized use by the public; in the event such use is occurring, additional and/or different measures should be taken to prevent motorized access.
- System trails shall be kept free of slash and usable throughout and at the end of harvest and fuels reduction operations.
- Trails impacted by hauling and/or skidding activities will be rehabilitated to restore them to their pre-impacted condition.

Cultural Resources

- Avoid known cultural sites.
- Should subsurface archaeological or historical materials be encountered during project activities, work shall be halted, and the San Juan National Forest or Pagosa Ranger District archaeologist notified immediately.
- Prior to implementation of project activities in areas where Section 106 consultation has not been completed, cultural resource surveys and Section 106 compliance work will be completed. Section 106 compliance work will include the development of mitigation measures for cultural resource protection and any required consultation with SHPO and THPOs.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

Additional Vegetation Management and Fuels Reduction

Some areas that were originally considered for vegetation management and fuels reduction treatment were dropped from consideration and the boundaries of other areas were adjusted after field reconnaissance was conducted. Areas were dropped for a variety of reasons including poor access options, not enough volume, or because treatment was not needed at this time.

Gravel Pit Development

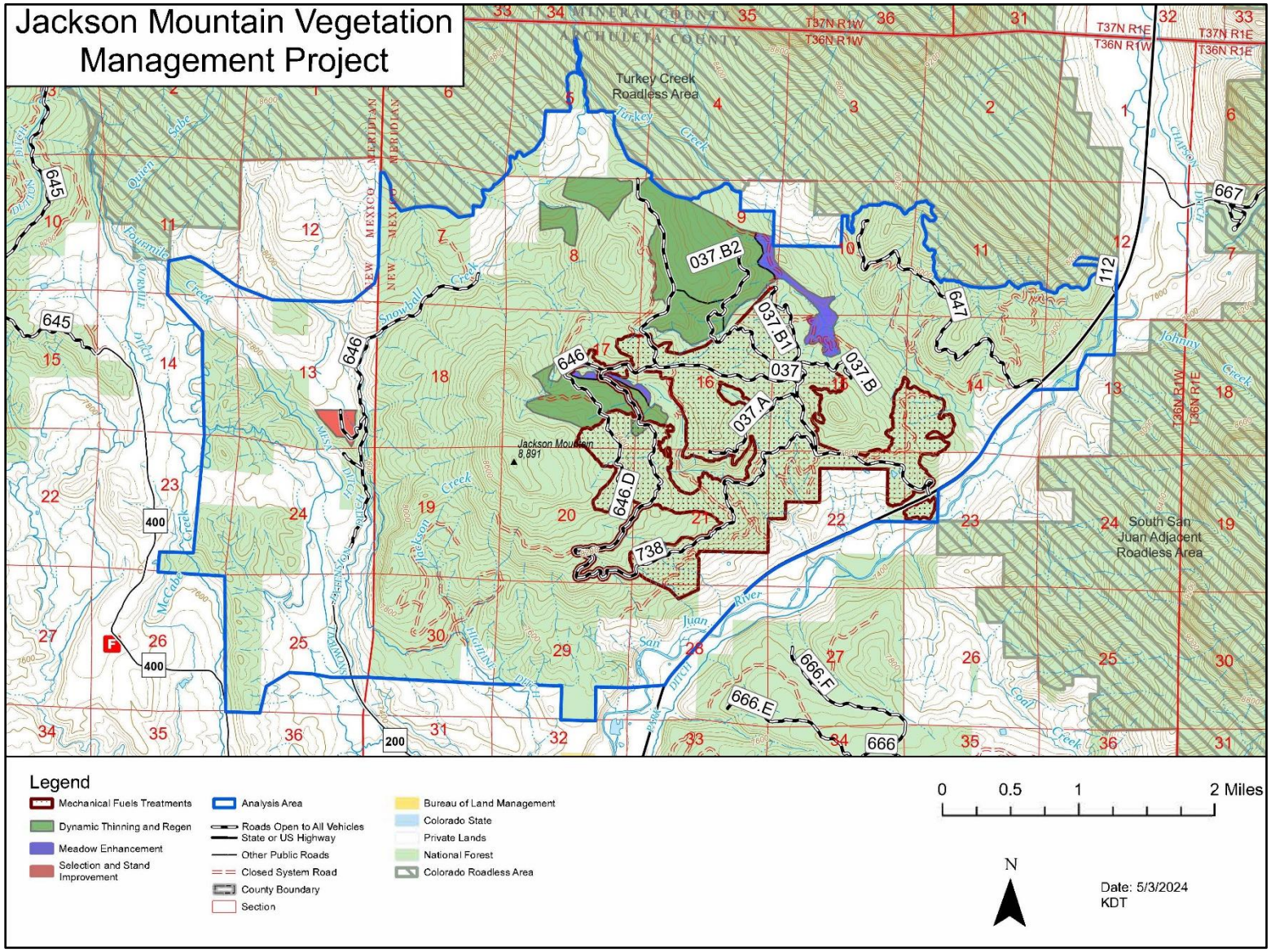
Archuleta County expressed interest in developing a non-commercial gravel pit in the Jackson Mountain area to provide a local source of material for use on county and Forest Service roads. An alternative was considered that would have analyzed the development of a non-commercial gravel pit in the Jackson Mountain area. However, the development of a gravel pit was eliminated from detailed consideration at this time because it was determined that further public involvement, discussion with partners, and additional reconnaissance of suitable

areas should occur before moving forward with a proposal for gravel pit development. A gravel pit may be considered in this or other areas of the District after further public and partner involvement and additional field work has occurred to determine the best locations for a gravel pit.

Trail System

An alternative was considered to develop a new trail system in the Jackson Mountain area, including mountain biking and multi-use trails, designated dispersed camping, parking areas, trailheads, and toilet facilities. These actions, as described in the scoping materials, were eliminated from detailed consideration due to concerns over the probable impacts on an important big game migration corridor in the Jackson Mountain area.

Figure 4: Alternative 2 (Proposed Action)



3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Vegetation and Fuels Management

Affected Environment

Forests in the Jackson Mountain landscape are composed of a mix of ponderosa pine and Gambel oak at low elevations with mixed conifer and aspen forests at higher elevations and on cooler northerly aspects. Soil depth, variation in aspect, and previous management have contributed to variations in forest composition, productivity, and density across the area.

Ponderosa pine forests dominate the lowest elevations, areas with shallow soils, and southern aspects. Dry mixed conifer stands feature scattered large diameter ponderosa pine with younger stand cohorts dominated by white fir (see Figure 5). Douglas-fir is less common but often occurs in patches and as individual trees. As the mixed conifer stands trend toward moister sites, Douglas-fir becomes more common and ponderosa pine becomes a rare component. Some stands of nearly pure white fir can be found but are uncommon and limited in size.

Figure 5: Old ponderosa Pine with white fir and Douglas -fir

Aspen is found scattered across the project area on all but the driest sites. Aspen can be found both as small patches and interspersed with conifers (see Figure 6). Due to a lack of large-scale disturbance such as fire, most aspen stands are showing signs of succession with declining canopies and the presence of understory white fir. Recent harvests in the project area have shown a strong coppice (root sprout) regeneration response, but heavy browse pressure from deer and elk on aspen regeneration has been observed.

Figure 6: Aspen Stand Transitioning to Conifer in Jackson Mountain Analysis Area

Old Growth

There are approximately 585 acres in the Jackson Mountain analysis area mapped as old growth stands. Old growth forests represent the late stages of forest development and are primarily distinguished by old trees, large trees, snags, and large woody debris on the forest floor. The criteria used for determining old growth stands on the San Juan National Forest and references in the Forest Plan are based on the Rocky Mountain Regional Guidelines (Mehl 1992). The general requirements for old growth stands include large trees for the site, variation in size and spacing, standing and down trees, decadence in the form of broken or deformed tops, boles, and root decay, multiple canopy layers, gaps in the canopy, tree age and general habitat characteristics that support these guidelines. Large, old trees also occur as individuals in stands that are not categorized as old growth.

Fuels

A standardized way to evaluate current conditions of lands in relation to their historic or "natural" reference condition is by looking at Fire Regime Condition Class (FRCC). FRCC classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g. insect and disease mortality, grazing, and drought) (Schmidt et al. 2002). FRCC I represents low departure from normal, FRCC II – moderate departure, and FRCC III – high departure. A majority of the analysis area falls within FRCC II (57%) and III (40%). Approximately half of the area proposed for fuels reduction treatment in the Jackson Mountain area is in FRCC II and half is in FRCC III. A majority of the potential treatment areas are within the Wildland-Urban Interface and the San Juan River Village subdivision is listed in the Archuleta County Community Wildland Fire Protection Plan as a high-risk area.

Management History

Forests in and around the community of Pagosa Springs were managed intensively beginning in the last decades of the 19th century. During this time, wildfires were suppressed, and the Forest was used intensively for livestock grazing. Large scale fires have been absent from the project area since 1873 (Wu, 2000). These early activities resulted in widespread tree establishment and a divergence from historic forest conditions with dense and often even-aged forest conditions common today. A two aged stand structure is also common across the landscape with older, large remnant ponderosa pine and Douglas-fir scattered with a second younger cohort of white fir.

Some commercial harvests from the 1950's occurred in the western portion of the project area within the Snowball Creek drainage, but most commercial harvests occurred in the 1970's. Harvests were mostly overstory removal cuts which produced even aged stands. Past harvests targeted ponderosa pine and Douglas-fir, while often deferring harvest of white fir due to historic timber markets. This targeted harvest along with the lack of fire likely increased the prevalence of white fir as a component of mixed conifer stands.

Recent management authorized in the 2007 Little Jackson Forest Health and Restoration Project decision was focused on the southeast corner of the current project area. Treatment focused on forest health within mixed conifer and ponderosa pine stands, with a minor component on coppice regeneration of aspen. Implementation of this project is still ongoing with approximately half of the planned 984 acres being treated to date.

The 2015 Laughlin Jackson Forest Health and Restoration Project decision approved 213 acres of management to address forest health concerns. Concerns focused on decline in white fir due to fir engraver beetles and other forest pests and decline in aspen stands. To date this project is planned but has not been implemented.

Approximately 385 acres in the Jackson Mountain analysis area have had fuels reduction treatments since 2017. This was primarily through mechanical thinning with biomass removal adjacent to Forest Service Roads 037 and 738. In addition, approximately 113 acres of understory shrubs and small trees were masticated adjacent to San Juan River Village subdivision in 2004. The current benefit of this mastication in negligible. There is no other record of additional fuels treatments. There have been 41 recorded fires on Forest Service land in the overall analysis area since 1960; the largest being 7 acres, with the vast majority under one half acre in size. Fire management challenges in the Jackson Mountain area include limited existing control features, moderate to high fuel loading, and relatively high stand densities in mixed conifer stands. In addition, several homes in the San Juan River Subdivision are in close proximity to NFS lands.

Management Context

The Jackson Mountain landscape is well-roaded and in close proximity to private lands to the east, west and south. A majority of the Jackson Mountain analysis area is designated for active management (management area 5), with some lands near private designated as public and private land intermix (management area 7). A well-developed transportation system is maintained here to facilitate active management and a wide range of public uses. Jackson Mountain has been the location of the Adaptive Silviculture for Climate Change (ASCC) study since 2012 and a snow survey site since 2023. Impacts of the proposed action should be viewed in the broader landscape context, as well as in the framework of identified goals, objectives, and desired conditions in the Forest Plan.

Noxious Weeds

Noxious weeds occur within and in close proximity to the analysis area. These noxious weeds are present in localized populations in or near disturbed sites, mostly along roads in the analysis area. Weeds are also found in areas grazed by cattle, near stock ponds, and in locations of historic logging operations. The most abundant noxious weed species are Canada thistle, musk thistle, yellow toadflax, and oxeye daisy. There are well-established populations of yellow toadflax and oxeye daisy along open and closed roads in the analysis area. There are populations of Canada thistle and musk thistle scattered throughout the analysis area, particularly in meadows and areas disturbed by cattle and logging operations. Oxeye daisy, Canada thistle and musk thistle are also prevalent in meadows and along ditches and riparian areas.

Noxious weed management is performed in compliance with the San Juan National Forest Noxious Weed Management Plan and the Forest Plan. The noxious weed management program uses an integrated approach based on manual, mechanical, biological, and chemical control. The Pagosa Ranger District has a weed management program that uses or considers these four control methods, depending on their efficacy.

Threatened, Endangered, and Sensitive Plant Species

There are no federally listed threatened or endangered plant species or habitat known to occur in the Jackson Mountain analysis area. There is habitat in the analysis area for one sensitive plant species (yellow lady’s slipper orchid) but there are no know populations of sensitive plant species in the analysis area.

Environmental Consequences

Alternative 1 – No Action

Under Alternative 1, vegetation management treatments authorized under previous decisions will continue to occur. In areas where no treatment is currently authorized, trends towards increasing canopy closure, tree and shrub density, fuel loadings, and decreasing grasses and other herbaceous vegetation would continue. Conifers would become established both within existing forested areas as well as on the edges of meadows. White fir and other shade tolerant species like blue spruce would establish within currently forested stands, with white fir likely comprising most of the species composition. Ponderosa pine would continue to establish in open areas, particularly during years of favorable weather conditions. Ponderosa pine would continue a long-term pattern of invading grassy openings and meadows throughout the analysis area.

The same forest health concerns identified in the last two decades are likely to continue or increase. In areas where there is a diversity of species, density, and age structure, the forest is more resilient and better able to withstand mortality pressures. However, where the forest is more homogenous, the forest is less resilient and less likely to withstand mortality pressures.

Aspen dominated areas would gradually transition to a more conifer dominant forest condition, although aspen would remain a component of mixed-conifer and some areas of ponderosa pine forests. Aspen stands will become less common across the analysis area. In localized areas, old aspen would die and fall, speeding up forest succession to white fir dominated stands. Aspen would also continue to sprout in tree canopy gaps in conifer forests and in stands of declining old aspen but would likely decline as a cover type across the landscape in the absence of a disturbance such as a wildfire. An example of an aspen stand in the Jackson Mountain analysis area that is transitioning to a conifer stand is shown in Figure 7.

Large old trees would continue to grow and decline at current or slightly increasing rates, with greater decline in areas of high tree density. Several species of bark beetles are present within the analysis area at endemic levels and would likely continue to kill low densities of old, yellow-bark ponderosa pine. Local observations on the Pagosa Ranger District indicate that bark beetles have remained at endemic levels, killing individual trees and patches of large older ponderosa pines over the last several years. These individual dead trees or small patches of dead trees are a desirable habitat component on the San Juan National Forest and may remain standing for decades after beetle-kill (USDA FS 2021).

Bark beetle activity and associated mortality in other tree species would continue under the No Action alternative. This would be most prevalent in Douglas-fir and white fir, as these species and localized beetle infestations are present throughout the analysis area in mixed-conifer forests. Mortality from these beetles would also reduce forest product values and dead trees would eventually become surface fuels. Heavy surface fuels would make active management in portions of the analysis area difficult and costly.

Under Alternative 1, due to limited existing control features, moderate to high fuel loading and stand densities in mixed conifer stands, and the close proximity to homes in the San Juan River Village, prescribed burning would be more difficult and costly to implement than in other areas of the District where mechanical fuels reduction has taken place. Therefore, it is unlikely Jackson Mountain would be prioritized for prescribed burning without additional mechanical fuels reduction projects being authorized. Because prescribed burning is unlikely to occur under the No Action Alternative, trends towards increasing canopy closure, tree and shrub density, fuel loadings, and decreasing grasses and other herbaceous vegetation will continue. Conifers will

establish both within existing forested areas as well as on the edges of meadows. White fir and other shade tolerant species like spruce will establish within currently forested stands, with white fir likely comprising most of the species composition. Ponderosa pine will continue to establish in open areas, particularly during years of favorable weather conditions. Ponderosa pine will continue a long-term pattern of invading grassy openings and meadows throughout the analysis area.

Impacts of an uncontrolled wildfire on vegetation within the analysis area would be mixed. Wildfires would result in a range of beneficial ecosystem effects, including releasing nutrients stored in vegetation, creating openings for grass and herbs, reducing small tree densities, and promoting conditions suitable for the establishment of aspen, Douglas-fir, and ponderosa pine (Romme et al 2009). Wildfire will contribute to the development of complex vegetation patterns across the analysis area through killing of variable sized patches and broader areas of large trees. Under favorable burn conditions, these patches would be small, but variable in size, well distributed and overall would represent a small, but significant portion of the landscape. However, under severe burning conditions, wildfire could result in large areas of tree mortality, as well as secondary mortality in future years as bark beetles attack fire-scorched trees (McHugh et al 2003). These more severely burned areas would be expected on steep slopes and in areas of continuous dense trees. Large old trees and stands categorized as old growth are also more likely to be impacted under severe burning conditions.

In a worst-case scenario, a severe fire could burn hundreds or thousands of acres in the analysis area at moderate to high severity. This would result in an expensive, hazardous, and potentially life-threatening emergency response in a heavily used recreation area adjacent to a developed subdivision. The most severely burned areas could convert from a forest to a shrubland condition dominated by Gambel oak (Romme et al 2009, Strom and Fulé 2007). While the probability of such a severe event is low given existing vegetation conditions, the possibility for such a scenario is increasing under a warming climate and longer and more intense fire seasons, (Nydick et al 2012, Stavros et al 2014). There is some evidence that such a condition could have occurred in historic times, but severe wildfires such as this were likely relatively rare and limited in extent (Baker 2019; Brown and Wu 2005; Grissino-Mayer et al 2004; Romme et al 2009). Regardless, this scenario is incompatible with current management goals, objectives, and desired conditions and a goal of the proposed action is to reduce the probability and negative outcomes of such an event.

Noxious Weeds

Noxious weeds would continue to spread from existing populations by a variety of vectors including livestock, wildlife (including birds), vehicles, recreationists, wind, and water, and therefore continue to be present in the analysis areas in both the short and long term, even if current levels of weed treatment are maintained.

Threatened, Endangered, and Sensitive Plant Species

Since there are no threatened or endangered plant species present in the project area and no suitable habitat for these species, there will be no effect to threatened or endangered plants.

There will be no impact to yellow lady’s slipper orchid or any other Region 2 sensitive plant species from the No Action Alternative since no sensitive plant species are known to occur in the project area. There may be short term impacts to suitable habitat for yellow lady’s slipper orchid from wildfires or other ongoing activities under the No Action Alternative.

Alternative 2 – Proposed Action

The proposed actions would provide forest products from areas identified in the Forest Plan as available for active forest management. Treatment would move forest stands towards a more diverse structure and promote landscape level resiliency. Forest health concerns would be addressed by reducing stand densities and regenerating stands with favorable species where appropriate. Creating a matrix of treatments will encourage not just current opportunities for management, but a long-term supply of wood products at a regular interval. The proposed action would promote patches of aspen dominant stands, both post-harvest and over the next century (see Figure 7). These managed patches would contain some conifers but would persist as a relatively pure aspen forest type compared to aspen areas under the no action alternative.

Figure 7: Recent harvest near proposed treatments with excellent aspen regeneration response

While the long-term effects of climate change are unknown, it is likely the occurrence of drought and insect and disease activity will increase in the future. While these pressures to forest health cannot be controlled, stands of diverse densities, species compositions, and age structures will be more resilient and are more likely to persist.

Within managed forest areas, the risk of bark beetle attack and other tree mortality factors would be reduced following treatments. Reducing the density of competing younger trees around old ponderosa pine would likely result in increased resin flow and foliar toughness, inferring some resistance to beetle attack (Covington et al 1997). Similar resistance is expected in retained Douglas-fir following harvest, although large and old Douglas-fir often remain susceptible to bark beetle attack following treatment (Negrón et al 1999). The risk of fir engraver beetle attack to white fir would be reduced in managed stands, primarily because the host tree species would be reduced through harvest. Increased resistance conferred to any very old and large retained white fir is likely to be minimal. These trees typically are in advanced decline, often hollow or having broken tops and little commercial value. During commercial harvests, these trees are typically retained for wildlife habitat value.

There will be minimal direct impacts to old growth stands and individual large, old trees in the analysis area because of the small percentage of old growth stands that will be treated. In the Jackson Mountain landscape, vegetation management treatments are proposed on approximately 88 acres of old growth stands. This accounts for approximately 15% of the mapped old growth in the analysis area. In addition, live old ponderosa pine and Douglas-fir established prior to approximately 1880 would be retained during planned harvest across all stands

and treatments. The only exception would be for safety reasons, to reduce declining trees with severe dwarf mistletoe infestation, root rot, or bark beetles. These exceptions will be made only in rare instances. This restriction further minimizes impacts to old growth stands and large, old trees. Fuels treatments are proposed on approximately 33 acres mapped as old growth. There should be no impact to old growth stands and individual large, old trees in the analysis area from the proposed fuels reduction activities as treatments will focus on reducing shrubs and small trees that act as ladder fuels which can transition a fire from the forest surface to the crowns of trees. There will be no impacts to large old trees from the proposed fuels treatments.

Long-term, the proposed treatments will help old growth stands and large, old trees be retained on the landscape. As old ponderosa pine and Douglas-fir continue to age and succumb to mortality agents, the need to encourage a new cohort of these species becomes evident. Regeneration of ponderosa pine and Douglas-fir would encourage the recruitment of young age classes of these long-lived species. Increasing these species as a component of the landscape would also bring future stands closer to a historic composition, which was altered by past management.

Reduction in fuel continuity and fuel loading would increase the opportunity for wildfire management and reintroduction. Treatments in aspen stands will also create larger nearly pure stands of aspen with low fuel loads and flammability that can serve to break up fuels at a landscape level. Reducing and/or rearranging fuels and increases in fire adapted species such as ponderosa pine and Douglas-fir would provide more and safer opportunities to manage wildfires within this landscape.

The proposed actions will counter some trends towards increasing canopy closure, tree and shrub density, fuel loadings, and decreasing grasses and other herbaceous vegetation. Strategically placed fuels treatment units will help reduce the risk of high intensity fire impacting private land, homes, and infrastructure. Additionally, it would allow for more efficient response to wildfires and reduce risk to firefighters and the public by creating areas with lower fuel loading.

The impacts of an uncontrolled wildfire on vegetation would remain mixed between beneficial and detrimental effects, with a shift towards more beneficial effects overall compared to the no action alternative. The proposed action would likely reduce fire severity on vegetation in harvested and immediately adjacent areas under all but the most severe weather conditions (Pollet and Omi 2002). In more productive moist mixed-conifer forests, beneficial fire effects from harvests will be minimal, and may likely increase fire hazards in the short term due to post-harvest slash accumulations. In these areas, fire hazard is highly affected by climate variables like precipitation, humidity and temperature rather than fuel accumulations, so treatments here are unlikely to significantly affect wildfire hazards or severity across the analysis area overall.

Noxious Weeds

Noxious weeds are expected to increase in the short-term under Alternative 2 relative to Alternative 1. This increase is expected along disturbed areas such as skid trails and log landings, especially where localized populations of noxious weeds are already present. Design elements adopted under Alternative 2 to control the spread of noxious weeds would mitigate the potential for new weed species establishing in the landscape. As a result, both alternatives should have minimal impact on the spread of new noxious weed species into the project area. Mitigation measures associated with Alternative 2 include treatment of known weed infestations prior to project activities and cleaning all off-road equipment prior to commencement of operations and moving between weed-infested areas to weed-free areas.

Threatened, Endangered, and Sensitive Plant Species

Since there are no threatened or endangered plant species present in the project area and no suitable habitat for these species, the Proposed Action will have no effect to threatened or endangered plants.

There will be no impact to yellow lady's slipper orchid or any other Region 2 sensitive plant species from the Proposed Action Alternative since no sensitive plant species are known to occur in the project area. There may be short term impacts to suitable habitat for yellow lady's slipper orchid from proposed activities, wildfires or other ongoing activities under the Proposed Action Alternative.

Cumulative Effects for Vegetation and Fuels Management

There are numerous past and current activities that have impacted vegetation in the analysis area including past timber harvests and road building, small forest product gathering (such as firewood gathering), recreation use, wildfire management, and fire suppression. Foreseeable future activities may include fuelwood gathering, continued commercial harvests, mechanical fuels treatments, increasing amounts of recreation use in the area, and fire management. No new system roads would be created through implementation of the proposed action, and temporary roads would be closed and rehabilitated following use. The implementation of this proposed action would have impacts similar to past harvests and previously authorized, on-going harvests in the project area. This proposed action would be a relatively minor increase in harvested acreage in the landscape. When combined with past, present, and reasonably foreseeable future activities in or around the analysis area, the proposed action would result in no cumulative impacts.

3.2 Wildlife and Fish

The Jackson Mountain analysis area provides habitat for a diversity of wildlife species. Different species occupy a diversity of habitats including water sources, riparian areas, grasslands, shrublands, deciduous forest, coniferous forest, mixed coniferous and deciduous forest, recently treated forests and rocky areas consisting of talus slopes and outcrops. Ponderosa pine and Gambel oak are the dominant vegetation types in the low elevations, with mixed conifer and aspen forests dominating the higher elevations and on cooler, northerly aspects. Water sources are limited to area stockponds, perennial streams (Snowball Creek and Turkey Creek) and ephemeral and intermittent drainages. Talus slopes and rock outcrops are present in several locations in the central and western portion of the analysis area.

There are numerous species that occupy the analysis area year-round, while others occupy the area seasonally. Additionally, some species are habitat specialists or are relatively restricted to certain habitats such as water sources and riparian areas or a particular vegetation type. Other species are habitat generalists and occupy a wide variety of vegetation types. Certain species prefer mature or late successional forests over young or mid-aged forests, while others thrive in young or mid-aged forests. Due to the diversity of habitats and species, it would be difficult to evaluate the effects from the proposed action to all species that occupy or potentially reside in the analysis area. For these reasons, species have been prioritized for analysis.

Wildlife species addressed in this analysis include local species of interest, migratory birds of conservation concern, Forest Service sensitive species and Federally listed species designated by the U.S. Fish and Wildlife Service (FWS). The analysis addresses existing habitat quantity and quality within the analysis area and habitat affected by the proposed action. Existing habitat was determined through field reconnaissance, professional judgement and species habitat modeling using vegetation information from the Forest's Geographic Information

System (GIS) database. Habitat quality was determined by evaluating existing habitat conditions to support primary biological needs for feeding, breeding, and security and dispersal.

Fire suppression, timber management, livestock grazing management, and motorized and non-motorized recreation have been the dominant factors affecting wildlife habitat and species use across the analysis area. Forest and shrubland vegetation across much of the analysis area is trending towards more mature age classes with dense and often even-aged, homogenous stand conditions. Vegetation management projects such as the Little Jackson and the Laughlin Jackson Forest Health and Restoration projects include treatments designed to reverse some of trends by decreasing stand densities and increasing age class diversity of aspen, and shade intolerant conifers species such as Douglas-fir and ponderosa pine. Treatments are designed to improve stand health and increase vegetation resiliency to insects, disease, and wildfire. Treatments proposed under this analysis are expected to achieve many of the same objectives, and therefore, potential positive and negative effects to species and habitats are expected to be similar to past vegetation management projects in the analysis area.

Livestock grazing along with motorized and non-motorized recreation have occurred across the analysis area for decades. The area is well-roaded and in close proximity to private lands to the east, west, south and the Pagosa Springs community. A well-developed transportation system facilitates active management and a wide range of permitted and public uses including livestock grazing and a variety of recreation activities. The transportation system provides good access for low to moderate levels of outdoor recreation spring through summer, in comparison to other areas across the Pagosa District. Recreational use increases during the fall season when big game hunting occurs. Moderate levels of outdoor recreation have corresponding disturbance impacts to species and habitats.

3.2.1 Local Species of Interest

Affected Environment

Elk and mule deer are species of interest because they provide important hunting and watchable wildlife opportunities across the Pagosa Ranger District. The opportunities these species provide are economic drivers for Pagosa Springs and surrounding communities in southwest Colorado. Elk and mule deer are hunted during the big game hunting seasons managed by Colorado Parks and Wildlife (CPW), which generally run from September through late November. Hunting seasons attract many resident and non-resident hunters to the area and provide important economic benefits to the community. Watchable wildlife opportunities occur year-round and provide additional interests and economic benefits to the community.

CPW 2022 post-hunt population estimates show the San Juan Basin mule deer and elk herds as the second largest in Colorado. Both herds occupy a large geographic area extending from the New Mexico State line north and east to the Continental Divide, and west to the Animas River near Durango, Colorado. The Pagosa Ranger District is part of the eastern portion of the herds' geographic boundary.

Elk and mule deer populations are managed across broad geographic areas referred to as Data Analysis Units (DAUs). The Pagosa District is located in DAU E31 for elk and DAU D30 for mule deer. Both DAU's include Game Management Units (GMUs) 77 and 78 that surround Pagosa Springs, and 771, 75, and 751 west of Pagosa Springs. The entire analysis area occurs in GMU 78.

Elk and mule deer population objectives and other relevant herd management information are described in herd management plans developed by CPW (Weinmeister, 2020a and 2020b). The current elk population objective

in E31 is 25,000-28,000 animals. The most current post-hunt population information estimates an elk herd of approximately 24,253 animals (CPW, 2023). Based on information collected by CPW, the greatest issue for the elk herd is the lack of recruitment. Calf to cow ratios have steadily decreased since 2006 and have been around 30 calves per 100 cows. The long-term average prior to the decrease was 41:100. CPW is currently researching the issue with hopes of identifying the cause and possible remedies.

The current deer population objective in D30 is 23,000-27,000 animals. The most current post-hunt population information estimates a mule deer herd of approximately 22,737 animals (CPW, 2023). The post-hunt deer population since 2001 has been below objective but has been increasing since due to good recruitment, minimal doe harvest and mild winters. Currently, there are no significant concerns over the deer population in D30.

The analysis area provides year-round habitat for elk, while mule deer are present spring through fall. High priority habitats as defined by CPW are present in the analysis area and include elk and mule deer migration corridors, and elk winter concentration areas and severe winter range. CPW also identifies production areas for elk, however no production areas were mapped in the analysis area. Field reconnaissance and monitoring was conducted during the 2022 and 2023 field season to verify elk production (calving activity) in the analysis area. Monitoring showed moderate to high levels of elk calving in certain areas, with an estimated 360 acres of concentrated use.

CPW is currently updating mapping of elk migration corridors across the San Juan basin including corridors present in the analysis area. The current corridor is located in the eastern portion of the analysis area. The updated corridor will include areas spanning across the north, east and western portions of the analysis area. A mule deer migration corridor overlaps the entire analysis area. The central and western portions of the analysis area are identified as winter concentration areas for elk, and the south and western portions are identified as elk severe winter range. High priority habitat acreages for elk and mule deer along with habitat affected by the proposed action are shown in Table 1 below.

Habitat quality for elk and mule deer across the analysis area has been influenced by management activities such as timber and fuels management, fire suppression, livestock grazing, and non-motorized and motorized recreation. Timber and fuels management activities over the last 20 years have focused on restoring species composition and age class diversity as well as reducing risk of high intensity wildfire by reducing fuel densities. Many of the treatments occurred in the central and eastern portions of the analysis area in more operable terrain. These activities have improved forage quality by increasing the presence and nutrient palatability of herbaceous vegetation. Minor reductions in cover have occurred, but overall effects have been negligible due to the extensive amount of untreated forest and shrublands across the analysis area. Untreated forests coupled with fire suppression have resulted in dense forest conditions with more contiguous and homogenous stand structure.

Localized impacts from livestock grazing are present in the form of cattle trails, noxious weeds, and soil erosion and disturbance along riparian areas and water developments.

Table 1: Summary of Important Elk and Mule Deer Habitat and Acreage

Elk and Mule Deer Habitat Acreage					
Acres of Severe Winter Range	Percent of Analysis Area	Acres of Winter Concentration Areas	Percent of Analysis Area	Acres of Migration Corridors	Percent of Analysis Area
Elk 3246 Mule deer 0	Elk 28% Mule deer 0%	Elk 7131 Mule deer 0	Elk 61% Mule deer 0%	Elk 3134 Mule deer 11703	Elk 27% Mule deer 100%
Elk and Mule Deer Habitat Affected by Harvest and Fuels Treatments					
Acres of Severe Winter Range Affected by Harvest Treatments and Percent of Habitat	Acres of Severe Winter Range Affected by Fuels Treatments and Percent of Habitat	Acres of Winter Concentration Areas Affected by Harvest Treatments and Percent of Habitat	Acres of Winter Concentration Areas Affected by Fuels Treatments and Percent of Habitat	Acres of Migration Corridors Affected by Harvest Treatments and Percent of Habitat	Acres of Migration Corridors Affected by Fuels Treatments and Percent of Habitat
Elk 30 (1%) Mule deer 0 (0%)	Elk 56 (2%) Mule deer 0 (0%)	Elk 208 (3%) Mule deer 0 (0%)	Elk 804 (11%) Mule deer 0 (0%)	Elk 105 (3%) Mule deer 816 (7%)	Elk 824 (26%) Mule deer 1578 (13%)

Non-motorized and motorized public recreation have increased over the last decade from increased visitation to the area. Access into the area is via the Jackson Mountain Road and Snowball road-motorized trail connector. Moderate to high recreation use occurs spring through summer, associated with motorized travel routes and user created non-motorized trails. Low to moderate motorized (snowmobiles) and non-motorized use (cross-country skiing and snowshoeing) occurs during winter. Increased recreation use has reduced habitat effectiveness for elk and mule deer in high density motorized and non-motorized trail locations particularly in the central portion of the analysis area.

Environmental Consequences

Alternative 1 – No Action

Habitat quality for elk and mule deer in the untreated areas is expected to remain similar to habitat described in the affected environment section in the short-term (less than 20 years). Over the long-term (20+ years), cover is expected to increase while forage quality continues to decline as dense forest and shrubland conditions dominate the untreated areas. Increased competition for soil moisture and solar exposure will limit the distribution, presence and forage quality of grass-forb forage. Opportunities to improve habitat quality for elk and mule under Alternative 1 would be limited to existing approved vegetation management projects and prescribed burns. This alternative would result in less habitat improvement for both species when compared to Alternative 2. A larger proportion of habitat may be at risk to natural disturbances such as high intensity wildfire, insects, or disease.

Alternative 2 – Proposed Action

The proposed harvests would affect up to 7% of the total habitat utilized by elk and mule deer across the analysis area. Fuels treatments would affect up to 13% of the total habitat utilized by elk and mule deer across the analysis area. Effects to elk and mule deer are primarily associated with disturbance from project activities and affects to habitat quality through mechanical vegetation treatments. The analysis focuses on disturbance impacts to high priority habitats identified by CPW including elk winter concentration areas and severe winter range, elk production areas and elk and mule deer migration corridors.

Elk winter concentration habitat: There are approximately 7131 acres of elk winter concentration habitat in the analysis area. Proposed harvest treatments will affect up to 3% and fuels treatments will affect up to 11% of the winter concentration habitat. Impacts to winter concentration habitat include the reduction in cover and increase in forage quality. The increase in forage quality would result from fuels treatments (mastication and mowing) that increase age-class diversity of Gambel oak and other shrub species that provide important browse for elk, particularly fall through spring. Fuels and harvest treatments would also create small openings in mixed conifer and aspen stands through coppice treatments, or enhance existing openings in dense shrublands, dense forest, and adjacent to existing meadows through meadow enhancement treatments. Elk use of habitat improved through treatments would be dependent on human presence and disturbance from fall through winter. Disturbance impacts to winter concentration areas would be minimized with application of seasonal restrictions during the winter period (December 1 to April 30).

Elk severe winter range: There are approximately 3246 acres of elk severe winter range in the analysis area. Proposed harvests would affect up to 1% and fuels treatments would affect up to 2% of severe winter range. Harvest would occur in the ponderosa pine dominated unit on western edge of the analysis area. Fuels treatments would occur in the southcentral portion of the analysis area. Effects to habitat in severe winter range are similar to winter concentration areas. The overall effects to elk severe winter range from harvest and fuels treatments would be negligible given the minor amount of habitat affected.

Migration corridors: The current elk migration corridor encompasses approximately 3134 acres of the analysis area. The mule deer migration corridor overlaps the entire analysis area. Harvest treatments would affect up to 3% of the vegetation in the elk migration corridor and up to 7% of the vegetation in the mule deer migration corridor. Fuels treatments would affect up to 26% of the vegetation in the elk migration corridor and 13% in the mule deer migration corridor. Effects to habitat in the corridors are similar to effects described for winter concentration areas (reduction in cover and increase in forage quality for both species). Treated areas would provide more nutrient rich forage for elk and mule deer migrating through the analysis area during spring and fall. More nutrient rich forage would benefit both species as they enter the winter period and energy reserves become crucial for survival. Nutrient rich forage is also important during spring as animals begin migrating to summer range and the onset of calving and fawning periods. No appreciable impacts are expected to migration corridors as treatments are expected to retain good interspersion of cover and forage, improve forage quality, and maintain habitat effectiveness for spring and fall migrations.

Elk production: Areas with high elk calving potential were monitored during the 2023 field season. Monitoring results showed moderate to high levels of use by cows and calves from spring through summer in certain areas. Proposed treatments are planned in or near these areas, while other areas will be unaffected. Treatments occurring in calving areas would impact calving habitat in the short-term (1-7 years) as vegetative covers is reduced thereby decreasing elk calf security in these areas. Regeneration of the areas with dense aspen saplings would provide security for young calves in 5-7 years post-treatment. Treated areas would also provide forage for elk and other wildlife as herbaceous vegetation (grasses, forbs and various shrubs) increase within a year post-treatment. Disturbance impacts to elk production areas would be minimized with application of seasonal restrictions during the calving period (May 15-June 30).

In summary, proposed treatments would result in temporary disturbance and displacement during project activities/operations, reduce some cover, and increase forage quality for elk and mule deer in the analysis area. No appreciable disturbance or habitat-related impacts are expected in elk winter concentration areas, severe

winter range, elk production areas or in elk and mule deer migration corridors. Treatments are expected to retain good interspersion of cover and forage, improve forage quality and maintain habitat effectiveness across the analysis area.

3.2.2 Migratory Birds

Affected Environment

Migratory bird species are an extremely diverse group and occupy a variety of habitats across the analysis area. Many migratory bird species utilize habitat in the analysis area for breeding, while others breed in more northern climates and migrate through the area. Ongoing bird monitoring by the Weminuche Audubon Chapter shows a diversity of bird species utilizing ponderosa pine dominated forests in the analysis area (Grover et. al 2021). Weminuche Audubon initiated monitoring in 2019 to assist the district in evaluating species response to prescribed burns and mechanical vegetation treatments in ponderosa pine forests. The monitoring site in the Jackson Mountain area was selected because it has not been subject to either thinning or prescribed fire in the last 75 years or longer (Grover et al 2021). A total of 33 bird species were detected in 2019, 45 in 2020 and 43 in 2021, 41 in 2022 and 48 in 2023. Current data shows some species are relatively common in the analysis area including American robin, western wood-pewee and green-tailed towhee, while others are less common such as olive-sided flycatcher, Virginia's warbler and Grace's warbler. Fuels treatments are planned in the study site under this analysis, providing an opportunity to compare bird response to post-treatment stand conditions. Shrublands, deciduous forest, coniferous forest and mixed coniferous and deciduous forest provide habitat for additional migratory birds including many species that utilize ponderosa pine forests.

The migratory bird species listed below are birds of particular concern because they occur on the U.S. Fish and Wildlife Service (FWS) Birds of Conservation Concern list or warrant special attention in the project area (USDI Fish and Wildlife Service, 2023). The list includes bald eagle, black swift, Cassin's finch, Clark's nutcracker, evening grosbeak, golden eagle, Grace's warbler, Lewis's woodpecker, olive-sided flycatcher, Virginia's warbler and western grebe. Some of these species utilize similar habitats while others are considered habitat specialists. Some of these species are known to occur in the analysis area while others utilize the area only temporally or prefer more suitable habitat outside the analysis area.

Species dismissed from further analysis due to lack of preferred habitat or absence of known nesting or breeding occurrence include bald eagle, black swift, golden eagle and western grebe. Species evaluated include Cassin's finch, Clark's nutcracker, evening grosbeak, Grace's warbler, Lewis' woodpecker, olive-sided flycatcher and Virginia's warbler. Grace's warbler, Lewis' woodpecker, olive-sided flycatcher and Virginia's warbler are addressed in the sensitive species section.

As described earlier, much of the vegetation across the analysis area is trending towards more mature age classes with dense and more even-aged, homogenous forest and shrubland conditions. Habitat quality for Cassin's finch, evening grosbeak, and Clark's nutcracker have declined across much of the analysis area as all species prefer more open forest conditions. Cassin's finch breeds in upland coniferous forests, aspen and ponderosa pine in Colorado and show preference for open forest canopies (Wickersham, 2016). Evening grosbeaks breed in mature, open, coniferous forest, especially mixed conifer consisting of Douglas-fir and ponderosa pine. Their preference for more open forest structure may be related to the availability of buds, fruits and seeds of deciduous understory shrubs which make up part of the species diet. Clark's nutcracker breeding behavior and habitat use are largely tied to the availability of pine seeds including limber pine, southwestern

white pine and bristlecone pine locally. Open coniferous forests are used for breeding and nesting most commonly occurs in montane conifer communities and subalpine conifer forests.

Table 2 describes existing habitat, habitat affected and season of use in the analysis area for Cassin's finch, Clark's nutcracker and evening grosbeak.

Table 2: Summary of Migratory Bird Habitat and Acreage

Species	Analysis Area Habitat and Season of Use	Existing Habitat in Analysis Area	Habitat Affected by Proposed Harvest	Habitat Affected by Fuels Treatments
Cassin's finch	**Habitat**: Riparian, limited pinyon-juniper (6 acres), ponderosa pine, mixed conifer, aspen forest mixed with conifer and limited spruce-fir (24 acres); nests in trees. **Season of use**: year-round.	8470	801 or 9%	1491 or 18%
Clark's nutcracker	**Habitat**: Riparian, limited pinyon-juniper (6 acres), ponderosa pine, mixed conifer, aspen forest mixed with conifer and limited spruce-fir (24 acres); nests in trees. **Season of use**: year-round.	8470	801 or 9%	1491 or 18%
Evening grosbeak	**Habitat**: Riparian, ponderosa pine, mixed conifer, aspen forest mixed with conifer and limited spruce-fir (24 acres); nests in trees. **Season of use**: year-round.	8464	801 or 9%	1491 or 18%

Timber management, fuels treatments, and fire suppression have been the dominant factors affecting vegetation and habitat quality for migratory birds in the analysis area. Timber management and fuels treatments have resulted in both negative and beneficial effects to migratory birds at mostly small scales and over short periods. Fire suppression has been a key factor affecting habitat quality for migratory bird species across much of the analysis area. In the western portion and some eastern portions of the analysis area, ponderosa pine stands are dense, relatively contiguous and predominately even-aged. Gambel oak is also dense and fairly homogeneous where it occurs in large contiguous clumps or in the understory of ponderosa pine and warm-dry mixed conifer stands. Dense forests and shrubland areas lack a diversity of age classes, and forest structure in these areas is highly departed from the historic range of variability. A more structurally diverse vegetative landscape, across a larger scale would improve habitat quality and sustain migratory bird habitat over the long-term.

Environmental Consequences

Alternative 1 – No Action

Habitat quality for migratory birds across the analysis area is expected to remain similar to habitat described in the affected environment section. Opportunities to improve habitat quality for migratory birds under Alternative 1 would be limited in scope and scale. Forest restoration efforts through prescribed burn treatments and previously cleared vegetation management activities in the analysis area would be the primary management actions that improve vegetation composition and structure in dense forested and shrubland areas. Despite these efforts, forest and shrubland areas across much of the analysis area would continue to lack a diversity in age classes important to sustain an equitable balance of quality foraging and breeding habitat for migratory birds. This alternative would result in less habitat improvement for migratory birds when compared to Alternative 2,

and a large proportion of migratory bird habitat may be at risk to natural disturbances such as high intensity wildfire, insects or disease.

Alternative 2 – Proposed Action

The overall objectives for timber harvest and fuels treatments under Alternative 2 are to move forested stands and shrublands towards a more diverse structure and promote landscape resiliency. Forest health concerns from insects, disease and high intensity wildfire would be addressed by reducing stand densities and regenerating stands with favorable species where appropriate such as aspen, ponderosa pine and Douglas-fir. Post-treatment stand conditions would generally be more open, with areas of unharvested or lightly harvested forest interspersed throughout harvested areas to maintain variability in age and habitat structure across the landscape. Opportunities to improve and sustain habitat for migratory birds under Alternative 2 will be greater than Alternative 1 given the overall objectives of increasing forest structure and age-class diversity.

Approximately 72% of the analysis area provides habitat for Cassin's finch, Clark's nutcracker and evening grosbeak. Of the total habitat available, 9% will be affected by timber harvest and 18% would be affected by fuels treatments. Effects to migratory birds are primarily associated with bird response to changes in habitat conditions over the short and long-term, and disturbance impacts during breeding seasons.

Positive and negative effects to migratory birds would be minimal due to the limited amount of habitat affected. Positive effects include increased habitat structure by increasing age class distribution of vegetation through mechanical vegetation treatments. Improved habitat quality for foraging and breeding would occur over the short and long-term as all species prefer more open forest conditions. Negative effects include the removal of vegetation currently utilized for foraging, breeding or security and disturbance to species foraging or breeding in the area. Disturbance impacts are associated with increased human presence and operation of equipment during treatments and other activities such as road maintenance and reconstruction of existing and temporary roads to facilitate operations. Disturbances may result in temporary displacement in localized areas and have potential to disrupt foraging and breeding activity. Negative effects would be limited in scope and scale given the small percentages of habitat treated across the analysis area.

3.2.3 Forest Service Sensitive Wildlife Species

Affected Environment

Sensitive wildlife species reviewed for this project are from the most recent Region 2 sensitive species list (USDA Forest Service, 2023). Eleven sensitive wildlife species have habitat in the analysis area and would be affected by the proposed action. Species affected include Pacific marten, fringed myotis, hoary bat, spotted bat, Grace's warbler, flammulated owl, Lewis woodpecker, northern goshawk, olive-sided flycatcher, Virginia's warbler, and western bumblebee.

Many of the sensitive species addressed in this analysis are associated with ponderosa pine and mixed conifer forests that dominate the analysis area. Over the last 20 years, forest restoration and wildfire mitigation treatments have improved habitat quality for pine and dry mixed conifer associated sensitive species in some areas. However, habitat quality across much of the analysis area continues to be marginal for reasons described for migratory birds, elk and mule deer. Many of the sensitive species are adapted to forests with more open stand conditions with variability in age structure, as opposed to dense, homogeneous, mostly even-aged stands. More information on habitat for sensitive species is provided in the Fish and Wildlife Biological Evaluation on file at the Pagosa Ranger District Office. Table 3 describes existing habitat, habitat affected and season of use in

the analysis area for Pacific marten, fringed myotis, hoary bat, spotted bat, Grace's warbler, flammulated owl, Lewis woodpecker, northern goshawk, olive-sided flycatcher, Virginia's warbler, and western bumblebee. Habitat descriptions and important habitat attributes for sensitive species were taken from several literature sources including Bats of the Rocky Mountain West (Adams, 2003), Mammals of Colorado, Second Edition (Armstrong et al. 2011), The Second Colorado Breeding Bird Atlas (Wickersham, 2016) and Raptors of Western North America (Wheeler, 2003) and Amphibians and Reptiles in Colorado, Second Edition (Hammerson, 1999).

Table 3: Summary of Sensitive Species Habitat and Acreage

Species	Analysis Area Habitat and Season of Use	Existing Habitat in Analysis Area	Habitat Affected by Proposed harvest	Habitat Affected by Fuels Treatments
Pacific marten	**Habitat**: cool-moist mixed conifer and spruce-fir. **Important habitat components**: mature forests with downed course woody debris, snags, and multi-storied stand structure. **Season of use**: year-round.	1001	285 or 28%	103 or 10%
Fringed myotis	**Habitat**: water, riparian, sagebrush shrubland, mountain grassland, mountain shrubland, pinyon-juniper and ponderosa pine. **Important habitat components**: snags, abandoned buildings, rock outcrops and cliffs for roosting. **Season of use**: spring through summer.	6734	76 or 1%	383 or 6%
Hoary bat	**Habitat**: water, riparian, pinyon-juniper, ponderosa pine, aspen, aspen with conifer, warm-dry and cool-moist mixed conifer and spruce-fir. **Important habitat components**: trees for roosting. **Season of use**: spring through summer.	8464	783 or 9%	1491 or 18%
Spotted bat	**Habitat**: water, riparian, mountain shrubland, pinyon-juniper and ponderosa pine. **Important habitat components**: snags or trees with suitable cavities for nesting. **Season of use**: spring through summer.	6347	76 or 1%	383 or 6%
Flammulated owl	**Habitat**: pinyon-juniper, ponderosa pine, aspen, aspen with conifer and warm-dry and cool-moist mixed conifer. **Important habitat components**: snags or trees with suitable cavities for nesting. **Season of use**: spring through summer.	8094	783 or 10%	1490 or 18%
Grace's warbler	**Habitat**: ponderosa pine. **Important habitat components**: mature ponderosa pine for nesting. **Season of use**: spring through summer.	3202	61 or 2%	295 or 9%
Lewis' woodpecker	**Habitat**: riparian, mountain shrubland, pinyon-juniper, ponderosa pine and aspen. **Important habitat components**: snags or trees with suitable cavities for nesting. **Season of use**: year-round.	5961	76 or 1%	383 or 6%

Species	Analysis Area Habitat and Season of Use	Existing Habitat in Analysis Area	Habitat Affected by Proposed harvest	Habitat Affected by Fuels Treatments
Northern goshawk	**Habitat**: riparian, ponderosa pine, aspen and aspen with conifer, warm-dry and cool-moist mixed conifer and spruce-fir. **Important habitat components**: snags and downed course woody debris (habitat for prey), mature forests/large trees for nesting. **Season of use**: year-round.	8460	801 or 9%	1491 or 18%
Olive-sided flycatcher	**Habitat**: riparian, ponderosa pine, aspen and aspen with conifer, warm-dry and cool-moist mixed conifer and spruce-fir. **Important habitat components**: snags and spike-topped trees for foraging. **Season of use**: spring through summer.	8460	801 or 9%	1491 or 18%
Virginia's warbler	**Habitat**: riparian, mountain shrubland, pinyon-juniper and ponderosa pine. **Important habitat components**: snags or trees with suitable cavities for nesting. **Season of use**: spring through summer.	6312	76 or 1%	1380 or 22%
Western bumblebee	**Habitat**: all habitats in analysis area. **Important habitat components**: flowering plants (nectar food sources). **Season of use**: spring through summer.	11615	816 or 7%	1578 or 14%

Environmental Consequences – Sensitive Species

Effects to sensitive species from Alternatives 1 and 2 were analyzed in the Fish and Wildlife Biological Evaluation. Based on the analysis conducted and application of design elements, the proposed action may **adversely impact individual sensitive species** but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing or loss of species viability range wide. Potential impacts to species include direct and indirect effects to existing habitat, habitat attributes and disturbance activities during project activities/operations. Proposed treatments would improve habitat quality over the long-term as treatments move vegetation composition and structure to more desirable conditions, thereby increasing foraging and breeding habitat for species and increasing resiliency of the forests and shrublands in the analysis area to disturbances such as high intensity wildfire, insect infestations, and/or disease.

3.2.4 Federally Listed Wildlife Species

Affected Environment

Federally listed wildlife species reviewed for this project are from the most recent FWS species list that may occur within the boundary of the proposed project and/or may be affected by the proposed action (USDI Fish and Wildlife Service,2024). Species are listed under the Endangered Species Act of 1973 as either threatened or endangered. There is no designated critical habitat for Federally listed wildlife species in the analysis area.

Federally listed species reviewed for this project include three mammals (Canada lynx, gray wolf and New Mexico meadow jumping mouse), three birds (Mexican spotted owl, southwestern willow flycatcher and yellow-billed cuckoo), one insect (silverspot) and two fish (Colorado pikeminnow and razorback sucker). Colorado pikeminnow and razorback sucker are addressed in the fisheries section. The list also includes two

Candidates for listing under the ESA (Rio Grande cutthroat trout and monarch butterfly). Rio Grande cutthroat trout is discussed in the fisheries section. Table 4 describes Federally listed species habitat on the SJNF, existing habitat in the analysis area and habitat affected by the proposed action.

Habitats descriptions for Federally listed species were taken from several literature sources including the Canada lynx conservation assessment and strategy, 3rd edition (Interagency Lynx Biology Team, 2013), Mexican Spotted Owl Recovery Plan, First Revision (USDI Fish and Wildlife Service, 2012), Southwestern Willow Flycatcher Recovery Plan (USDI Fish and Wildlife Service, 2002), Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-billed Cuckoo (USDI Fish and Wildlife Service, 2014a), Species Status Assessment Report for New Mexico Meadow Jumping Mouse (USDI Fish and Wildlife Service, 2014b), Species Status Assessment Report for Monarch (USDI Fish and Wildlife Service, 2020), Species Status Assessment for Silverspot Butterfly (USDI Fish and Wildlife Service, 2021) and information from the FWS Information for Planning and Consultation (IPaC) website (USDI Fish and Wildlife Service, 2023). More information on habitat for Federally listed species is provided in the Fish and Wildlife Biological Evaluation on file at the Pagosa Ranger District Office.

There is no habitat in the analysis area for Canada lynx, New Mexico meadow jumping mouse, southwestern willow flycatcher, yellow-billed cuckoo or monarch butterfly. Potential habitat is present for gray wolf, Mexican spotted owl and silverspot butterfly. Habitat for these species is described in Table 4.

Table 4: Summary of Federally Listed Species Habitat and Acreage

Species and Status	Habitat on the SJNF and Season of Use	Existing Habitat in Analysis Area	Habitat Affected by Proposed harvest	Habitat Affected by Fuels Treatments
Gray wolf – Endangered	**Habitat:** variety of vegetation types across all elevations where suitable prey (elk, deer, moose, and others) are present. **Season of use:** year-round where present.	11615	816 or 7%	1578 or 14%
Mexican spotted owl – Threatened	**Habitat:** canyon habitats contain uneven-aged stands of mature mixed-conifer (Douglas-fir and ponderosa pine) on north facing slopes and ponderosa pine, Gambel oak and pinyon-juniper on the south and west facing slopes. **Season of use:** year-round where present.	Less than 100 acres in the western portion of analysis area.	0 No treatments occurring in or near habitat.	0 No treatments occurring in or near habitat.
Silverspot butterfly – Proposed	**Habitat:** permanent spring-fed meadows, seeps, marshes, and boggy streamside meadows up to approximately 8500 ft. elevation, with populations know to occur between 5,200 and 8,300 ft elevation. Associated with bog violets (*Viola nephrophylla/V. sororia var. affinis*), which larvae feed on exclusively. **Season of use:** spring through summer where present.	Potential habitat may be present in analysis area.	0 Avoidance through design elements.	0 Avoidance through design elements.

Environmental Consequences

Alternative 1 – No Action

There is no requirement under ESA to analyze effects to Federally listed species under Alternative 1.

Alternative 2- Proposed Action

There is no habitat in the analysis area for Canada lynx, New Mexico meadow jumping mouse, southwestern willow flycatcher, yellow-billed cuckoo or monarch butterfly. There are no proposed harvest or fuels treatments planned in potential Mexican spotted owl habitat. Additionally, treatments would occur well outside owl habitat and therefore no disturbance impacts to this species are expected. Potential habitat for silverspot butterfly will be avoided through application of watershed protection design elements for springs, spring-fed meadows, riparian areas and perennial streams. The proposed action will have no effect to Canada lynx, New Mexico meadow jumping mouse, southwestern willow flycatcher, yellow-billed cuckoo, monarch butterfly, Mexican spotted owl, or silverspot butterfly.

Habitat is present for gray wolf in the analysis area, but there are no known or reported wolves in the area. Additionally, the proposed action does not include a predator management plan. The proposed action would have short-term impacts to elk and mule deer habitat, and long-term beneficial effects to habitat. Habitat for gray wolf will be improved with the improvement to elk and mule deer habitat from proposed treatments. There would be no overall effects to gray wolf.

3.2.5 Fish Species

Affected Environment

Fish habitat and occupancy in the analysis area is limited to Turkey Creek a tributary of the San Juan River and Snowball Creek, a tributary of Fourmile Creek and the San Juan River. Brown trout, rainbow trout and mottled sculpin are present in Turkey Creek. Brown trout, brook trout, rainbow trout, non-native cutthroat trout and mottled sculpin are present in Snowball Creek. There are no populations or habitats for sensitive fish populations in the analysis area (Colorado River cutthroat trout, flannelmouth sucker, bluehead sucker or roundtail chub). Habitat and known occurrence of sensitive fish species are located outside the analysis area and would be unaffected by the proposed action. Additionally, there are no populations or habitat for Rio Grande cutthroat trout, a Candidate species for listing under ESA in the analysis area. There is no habitat for Colorado pikeminnow or razorback sucker, Federally listed endangered species. Both species reside off-Forest and are affected by water depletions occurring in the Upper San Juan River Basin.

Water availability is the limiting factor for non-native trout species in the analysis area. Snowball Creek and Turkey Creek are perennial streams that experience minimal flows from later summer until high flows are present during spring runoff. Fish populations are affected by minimal flows, particularly during late summer through winter. Populations are also influenced by increased water temperatures during minimal flow periods during summer. Despite the minimal flows present, both streams provide self-sustaining fish populations and sport fishery opportunities.

Environmental Consequences

Alternative 1 – No Action

There would be no impact to non-native fish populations as there are no activities proposed that would affect water availability, quality or temperatures in Snowball Creek and Turkey Creek.

There would be no effect to Colorado pikeminnow or razorback sucker as there are no water depletion activities proposed under Alternative 1. There would be no effect to Federally listed endangered species.

Alternative 2- Proposed Action

There would be no impact to non-native fish populations as there are no activities proposed that would affect water availability, quality or temperatures in Snowball Creek and Turkey Creek. Proposed timber harvest and fuels treatments are well removed from Snowball Creek, Turkey Creek and intermittent tributaries of both streams. Treatments would have no impact to year-round habitat for non-native fish species in either Snowball Creek or Turkey Creek.

There would be no effect to Colorado pikeminnow or razorback sucker as there are no water depletion activities associated with the proposed action. There would be no effect to Federally listed endangered fish species.

Cumulative Impacts for Wildlife and Fisheries:

Habitat for wildlife across the analysis area has changed over time as a result of management activities and natural disturbance processes. Past activities such as timber harvest, fire suppression, and livestock grazing coupled with drought have altered habitat for wildlife. The resulting effects have been reduced habitat quality for many species, particularly species adapted to live in more open forest conditions in the area's ponderosa pine and warm-dry mixed conifer forests. Additionally, insect and disease levels in the area's mixed conifer forests have reduced habitat quality for species associated with coniferous forests. Reduced habitat quality in the area coupled with increasing recreational use are the dominant factors influencing wildlife.

The proposed action will result in both positive and negative direct and indirect effects to local species of concern, migratory birds and sensitive species. Overall, the effects will be minor in scope, scale and duration based on the small percentages of habitat affected by the proposed action. The proposed action will help reverse habitat-related impacts from past actions across the analysis area. The improvement in forest health, increased resiliency, and reduced risk of high intensity wildfire, would provide more sustainable habitat for species over the long-term. The proposed action would add to the expected increase in human presence and disturbance in the analysis area; however, habitat effectiveness is not expected to be compromised in the short-term or long-term due to improved habitat quality and abundant habitat within the analysis area for species dispersal should disturbances exceed their tolerance. The proposed action combined with past, present and foreseeable actions, is not expected to contribute adverse cumulative impacts to wildlife in the analysis area.

There will be no cumulative impacts to fisheries as there are no direct or indirect effects from the proposed action.

3.3 Watershed and Soils

Affected Environment

The Jackson Mountain Analysis Area is within the Upper San Juan River Basin, specifically the Turkey Creek subwatershed, the Four Mile subwatershed, and areas that drain directly into the San Juan River from Jackson Mountain.

Stream Beneficial Uses/Water Quality: The waters of Colorado have been designated according to the beneficial uses for which they are presently suitable or intended to be suitable. The use classifications for streams in the analysis area are Cold Water Aquatic Life 1, Warm Water Aquatic Life 1, Warm Water Aquatic Life 2, Recreation E, Recreation N, Recreation P, Water Supply and Agriculture (Colorado Department of Public Health and Environment, Water Quality Control Commission - CDPHE, 2023).

No stream segments within or downstream of the analysis area are listed by the Water Quality Control Division of Colorado (WQCDC) for water quality impairment (CDPHE, 2023). Nor are any stream segments within or

downstream of the analysis area on Colorado's Monitoring and Evaluation list (CDPHE, 2023). All stream segments in the analysis area are currently classified as fully supporting their beneficial uses.

Forest Plan Standards: Applicable Riparian and Water Resources Standards and Guidelines from the San Juan National Forest Plan include 2.4.19 – 2.4.24, and 2.4.27 – 2.4.30, and 2.6.40. Integral to meeting Forest Plan standards and guidelines and ensuring that riparian areas, stream and channels are moving towards desired conditions is the use of appropriate best management practices or design elements.

Executive Orders 11988 and 11990: The objectives of Executive Order 11988, Floodplain Management, are to reduce the risk of flood loss and minimize the impact of floods on human safety, health and welfare; to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative; and to restore and preserve the natural and beneficial values served by floodplains. EO 11990 requires the Forest Service to take action to minimize destruction, loss, or degradation of wetlands and to preserve the natural and beneficial values of wetlands.

Stream Channel Conditions: Most of the streams located in the analysis area are intermittent or ephemeral in flow regime and are in stable condition. These streams exhibit dynamic equilibrium characteristics and are operating and responding appropriately under their current environment. These systems can absorb and respond to disturbances that they have evolved under within their historic range of variability. One wetland was located and mapped in Laughlin Park upstream of NFSR 738 road crossing.

In general, there was no evidence that stream width/depth ratios are outside what is considered normal for the stream types. Nor are there excessive amounts of fine sediment built up in pools or around rocks and boulders in the streams. However, localized impacts to the streams in the analysis area occur from roads.

Roads: Many open and closed roads exist in the analysis area. Roads are the dominant source of soil erosion and stream sediment in roaded forest environments. Road-stream crossings are often sediment sources into streams. The proximity of the road fill to the stream channel means that essentially any sediment eroded off the road fill would be delivered directly to the stream.

A field assessment of maintenance level one (closed system roads) and the Snowball Connecter Trail was conducted within the analysis area during the 2021 field season. Roads were ranked in either good, fair, or poor condition depending on roadbed stability and whether there were indications of water and sediment are being channeled into streams or drainages. Of the 27 roads assessed, three were found to be in poor condition, 14 in good condition and 10 in fair condition. Two of the routes ranked as 'poor' were within the NFSR 632 series located in the southwest part of the analysis area. These roads are not proposed to be used to access vegetation treatments. The Snowball Connector Trail was also ranked as poor due to erosion at stream crossings.

Environmental Consequences

Alternative 1 – No Action

This alternative proposes no timber harvest or mechanical fuels treatment activities, so there would be no effects on the streams of the analysis area from such activities. There would be no improvements to the roads such as replacing culverts or hardening drainage structures (rolling dips and grade dips). Culverts that are currently damaged and non-functional would remain that way, causing erosion of the road prism and surrounding area and direct sediment input to streams. Rolling dips and grade dips on native surface roads

would continue to hold water and be muddy, causing soil displacement when vehicles drive through them. Where these areas are near stream channels, sediment would continue to be transported into the streams.

Alternative 2 – Proposed Action

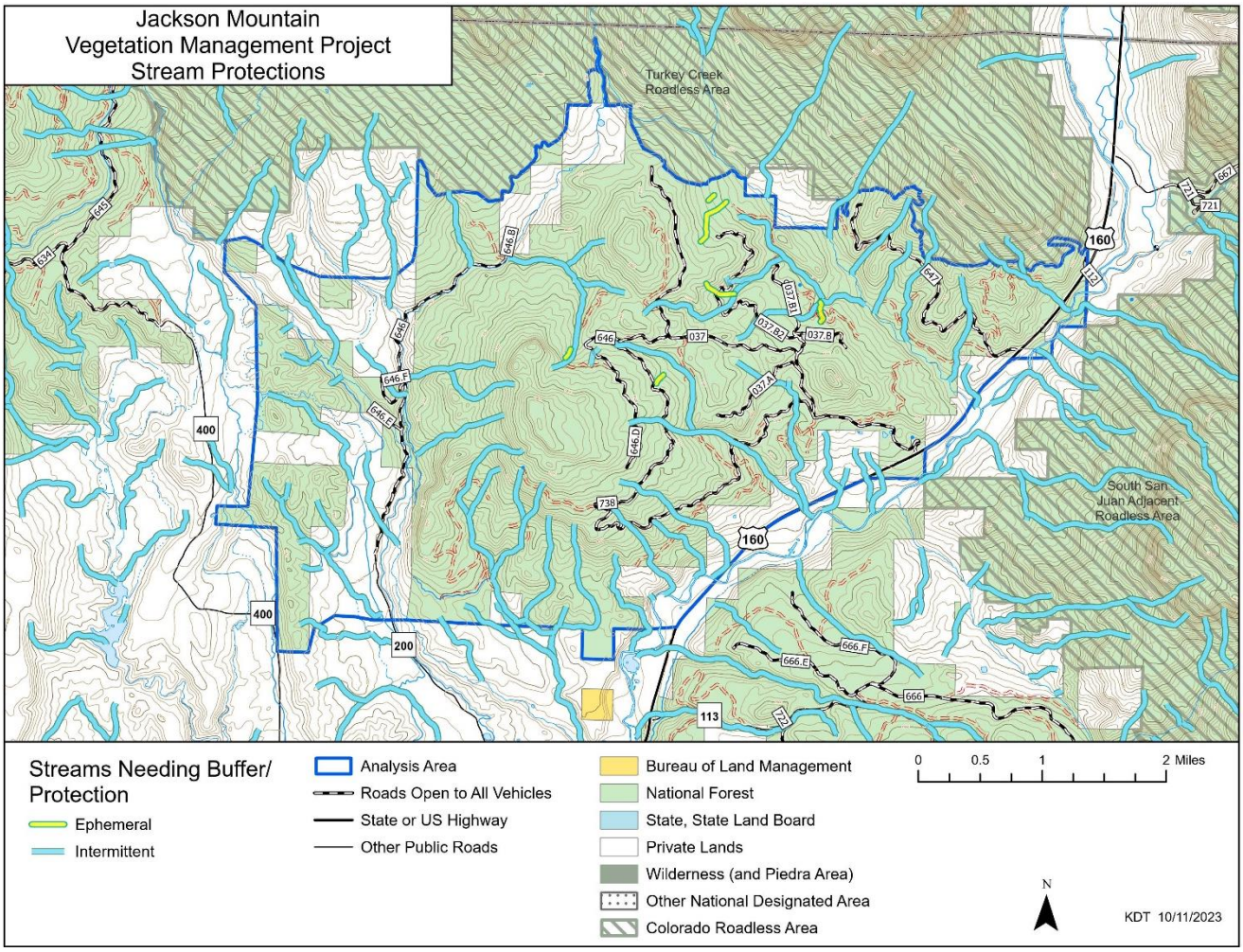
Changes in erosion and sedimentation into streams are the most likely potential watershed impacts that could occur from the proposed activities. Construction and reconstruction of roads are the activities most likely to increase sedimentation into streams. Road construction and reconstruction may result in limited, short-term erosion which may deliver fine sediment to channels in areas where the road work is in close proximity to stream channels. Most of the road construction and reconstruction is not near stream channels. The temporary roads would be built with culverts at swale and headwater stream crossings in order to minimize sediment delivery to channels during use. The temporary roads would be decommissioned within 5 years of sale closure. Timber harvest and mowing activities may increase erosion locally, but this sediment is not expected to reach stream courses due to the distances from treatment units to stream courses and the use of design elements. Most of the channels within and near treatment units are ephemeral or intermittent. Stream buffers would be designated where necessary which will eliminate direct impacts and retain filtration properties of near-channel vegetation. Potential increases in sediment associated with treatment activities and roads would be minimal and is not expected to have an effect on channel conditions. Impacts to water quality or stream beneficial uses are not expected. There would be no long-term adverse effects to aquatic health or channel integrity.

Burning of slash piles would result in moderate to high soil burn severity, a reduction in litter and duff ground cover, and exposure of mineral soil under the piles. Increases in overland and peak flows are not expected because slopes to be treated are generally not steep (less than 35%) and the piles will cover only a small and discontinuous portion of the project area.

Improvements, such as replacing culverts or hardening drainage structures (rolling dips and grade dips) would be made on the roads. Culverts that are currently damaged and non-functional would be repaired or replaced, eliminating current erosion of the road prism and surrounding area and direct sediment input to streams. Rolling dips and grade dips on native surface roads would drain properly and would be hardened so that they would maintain their configuration. They would no longer hold water or be muddy and wouldn’t cause soil displacement when vehicles drive through them. Where these areas are near stream channels, sediment would no longer be transported into the streams. These actions would greatly reduce the amount of erosion, rutting, and sediment transport and delivery to streams currently occurring on the roads.

Adherence to design elements during vegetation management project implementation would result in minimal and short-lived soil and water impacts.

Figure 8: Water Features in the Jackson Mountain Analysis Area



Cumulative Impacts for Watershed and Soils:

Watershed condition and vulnerability to disturbance has been analyzed on the San Juan National Forest two different ways; the San Juan National Forest Land and Resource Management Plan utilized the Aquatic, Riparian and Wetland Ecosystem Assessment and the Watershed Condition Classification was implemented for all forests nationwide.

Aquatic, Riparian, and Wetland Ecosystem Assessment: The Aquatic, Riparian, and Wetland Ecosystem Assessment (ARWA) was completed to describe the aquatic and terrestrial ecological characteristics of watersheds on the forest as well as the influence upon them by anthropogenic activities. This analysis was completed for the Forest Plan to identify watersheds that may be good candidates for remediation. The watersheds effected by the proposed action were not identified as having a large amount of anthropogenic disturbance (Forest Plan, p. I-3). In addition, field work conducted during the 2021 and 22 seasons did not find indications of instability in stream and riparian resources or opportunities for remediation within the analysis area.

Watershed Condition Classification: The Watershed Condition Classification completed in 2012 used 12 indicators composed of attributes related to watershed processes. The indicators and their attributes are

surrogate variables representing the underlying ecological functions and processes that affect soil and hydrologic function. (Watershed Condition Classification Technical Guide, 2011). All watersheds effected by the proposed action were rated in 'fair' condition which describes a watershed with some departure in geomorphic, hydrologic and biotic integrity relative to natural potential condition.

Adherence to design elements during vegetation project implementation would result in minimal and short-lived soil and water impacts. Cumulative impacts to soils and watershed values are not anticipated from the proposed action based on the above discussion.

3.7 Climate Change

Affected Environment

Scope: The effects analysis area for carbon includes forested lands within the San Juan National Forest because this is where mastication, thinning, and tree removal treatments are proposed and where carbon stocks may be affected. The special boundary for the effects for GHG emissions is the global atmosphere given the mix of atmospheric gases can have no bounds. The timeframe for the direct effects analysis is approximately 10 years because all project activities should be completed by then. The timeframe for the indirect effects is 100 years.

Context: The carbon legacy of the San Juan National Forest is tied to the history of western U.S. settlement, land management, and disturbances. Historical disturbance dynamics such as the spruce bark beetle and wildfire, forest regrowth and recovery, and forest aging have been most responsible in driving carbon accumulation trends since 1950. The San Juan NF contains an estimated total of 99.7 teragrams of carbon. Forests in the San Juan National Forest are maintaining a carbon sink and forest carbon stocks have increased by 19.3 percent between 1990 and 2021 (Reinemann et al., 2023). The negative impacts on carbon stocks caused by disturbances (mostly spruce bark beetle) and climate conditions have been moderate but have been exceeded by forest growth. Roughly 75 percent of the stands in the San Juan National Forest are middle-aged and older (greater than 80 years) and there has been a pulse of young stands (<10 years old) that were established in the early 2000s (Reinemann et al., 2023). These younger stands represent regeneration after recent disturbances-mostly extensive insect outbreaks. If the Forest continues on this aging trajectory, more stands will reach a slower growth stage in coming years, potentially causing the rate of carbon accumulation to decline.

Timber harvest has been a minor disturbance type on the San Juan National Forest from 1990 to 2011, although harvesting has typically affected less than one percent of the forested area annually (Reinemann et al., 2023). During this period, about less than one percent of the forested area experienced some level of harvest treatments. Carbon losses from the forest ecosystem associated with harvests have been small compared to the total amount of carbon stored in the forest, with losses from 1990 to 2011 equivalent to about 0.32 percent of non-soil carbon stocks (Reinemann et al., 2023). However, these estimates represent an upper bound, because they do not account for continued storage of harvested carbon in wood products or the effect of substitution.

Fire has been a moderate disturbance type on the San Juan NF from 1990 to 2011, with wildfires and prescribed fire affecting about three percent of the forested area annually (Reinemann et al., 2023). Records from the San Juan NF indicate the forest planned and implemented prescribed burns on approximately 150,000 acres between 1990 and 2023, totaling about seven percent of land on the San Juan NF. Prescribed fires appear to have a limited impact on carbon storage, particularly as compared to wildfire. Carbon losses from the forest ecosystem associated with fires have been relatively small compared to the total amount of carbon stored in the forest, with losses from 1990 to 2021 equaling only one percent of non-soil carbon.

Climate change introduces uncertainty about how vegetation—and vegetation carbon uptake and storage—might change in the future. Climate change causes direct alterations of the local environment, including temperature and precipitation, and indirectly affects a wide range of ecosystem processes (Vose et al., 2018), including vegetation growth, regeneration, and mortality.

Because disturbance regimes are projected to shift with climate change (Vose et al., 2018), understanding past trends is not sufficient to fully understand vegetation carbon dynamics in the future. A climate change vulnerability assessment for the US Forest Service Rocky Mountain Region (Rice et al., 2018) indicates that temperatures will increase throughout the 21st century under low and high greenhouse gas (GHG) emission scenarios. Minimum and maximum temperatures are projected to increase in all seasons, and the frequency of summer days with extreme heat is likely to increase. Higher temperatures will increase the length of the growing season. A longer growing season may enhance vegetation growth and carbon sequestration, particularly where water supply is adequate and temperatures are not excessive (e.g., at higher elevations) (Vose et al., 2018). However, elevated temperatures may also increase evapotranspiration, resulting in increased soil respiration and reduced soil moisture. Thus, higher temperatures may negatively affect growth rates and carbon accumulation (Melillo et al., 2017), particularly in water-limited vegetation at lower elevations.

Precipitation projections for the Rocky Mountain Region are less certain than for temperature, but moisture availability is likely to be lower even if precipitation remains the same, given the projected increases in temperature (Rice et al., 2018). Since climate is influenced by elevation, aspect, and topography, so temperature and precipitation patterns will vary across the San Juan National Forest.

The combination of higher temperature, lower snowpack, and more consecutive dry days related to climate change will likely lead to lower soil moisture and greater drought stress (Wehner et al., 2017). These effects will be more pronounced at middle and lower elevations. Drought stress may negatively affect plant productivity and carbon uptake and storage and increase effects of other stressors. More frequent and severe disturbances may result in decreasing carbon stocks over time.

Climate change and associated stressors are likely to lead to changes in the distribution and abundance of vegetation, particularly by the end of the 21st century. For example, the extent of lower-elevation species, such as ponderosa pine, is projected to expand at higher elevations while declining at lower elevations (Rice et al., 2018). Species at the southern extent of their range, such as lodgepole pine, may decline under future climate conditions. These changes in species and abundance may also influence carbon uptake and storage.

Vegetation shifts are most likely to occur after disturbance. For example, drought stress might preclude the establishment of tree species after high-severity disturbance, allowing dominance by non-forest vegetation (e.g., grasses and shrubs) (Behrens et al., 2018). Increased frequency and intensity of disturbances, such as fire and/or wind events, might favor species that resprout quickly following disturbance, such as quaking aspen and Gambel oak. (Rice et al., 2018). Establishment of non-native and invasive species, such as cheatgrass, might also increase after disturbance (Hellman et al., 2008). Invasive species establishment can shift the dominance of vegetation (e.g., from perennial shrubs to annual grasses) and alter the fire regime by changing fuels (Balch et al., 2013). These and other vegetation type shifts could alter the long-term carbon storage in some ecosystems. On the San Juan NF, aspen and mixed aspen conifer range in elevation from 7,500 to 10,500 feet. Warming trends and drier conditions are expected across the entire ecosystem range. Increasing drought and temperatures are likely to stress stands at lower elevations and southwestern facing slopes (Decker et al.,2014). Modeling by

Rehfeld et al. suggests that the climate profile favorable for aspen in the western USA could decline by 40–75% by 2060 (2009).

Carbon dioxide (CO2) emissions are projected to increase through 2100 under most emission scenarios, and increased carbon dioxide levels can increase plant growth (IPCC, 2021). Several models, including the InTEC model, project future increases in forest productivity when the CO2 fertilization effect is included in modeling (Zhang et al., 2012). However, the effect of increasing levels of atmospheric CO2 on forest productivity is likely to be transient and can be limited by the availability of nitrogen and other nutrients (Norby et al., 2010). Thus, increases in plant productivity under elevated CO2 are likely to be offset by losses from climate-related stress or disturbance.

Some assessments suggest that the effects of climate change in some United States forests may cause shifts in forest composition and productivity or prevent forests from fully recovering after severe disturbance (Anderson-Teixeira et al., 2013), thus impeding their ability to take up and store carbon and retain other ecosystem functions and services. Climate change is likely already increasing the frequency and extent of droughts, fires, and insect outbreaks, which can influence forest carbon cycling (Kurz et al., 2008; Allen et al., 2010; Joyce et al., 2014). Reducing stand density, one of the goals of this proposed action, is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Joyce et al., 2014). This proposed action is consistent with options proposed by the IPCC for minimizing the impacts of climate change on forests, thus meeting objectives for both adapting to climate change and mitigating GHG emissions (McKinley et al., 2011).

Given the complex interactions among forest ecosystem processes, disturbance regimes, climate, and nutrients, it is difficult to project how forests and carbon trends will respond under novel future conditions. The effects of future conditions on forest carbon dynamics might change over time. For example, as climate change persists for several decades, critical thresholds might be exceeded, causing unanticipated responses to some variables like increasing temperature and CO2 concentrations. The effects of changing conditions will almost certainly vary by species and vegetation type. Some factors might enhance vegetation growth and carbon uptake, whereas others might hinder the carbon storage ability of certain vegetation types.

Forests play an important role in the global carbon cycle by taking up and storing carbon in plants and soil. Forestry has gained attention in recent decades because of its potential to influence the exchange of carbon with the atmosphere, either by increasing storage or releasing carbon emissions. Forests have a carbon “boom and bust” cycle. They take up and store atmospheric carbon as they grow through photosynthesis; then they release carbon through mortality due to aging or disturbances. Following mortality events, forests regrow, and the cycle continues. (Dugan et al., 2019). Forests can store carbon in soils and plant material as well as in harvested wood products outside of the forest ecosystem. In addition, wood fiber can be used to substitute for products that are more energy-intensive to produce, such as concrete and steel, creating a substitution effect which can result in lower overall greenhouse gas emissions (Börjesson, et al., 2000).

A quantitative assessment of forest carbon stocks and the factors that influence carbon trends (management activities, disturbances, and environmental factors) for the San Juan National Forest (NF) is available in the project record (Reinemann et al., 2023). This carbon assessment contains additional supporting information and references.

Environmental Consequences

Alternative 1

There would be no vegetation and fuels management treatments under the No Action Alternative, and therefore no tree removal as a result of this project. Existing carbon stocks would remain relatively stable in the short-term. In the absence of commercial thinning, the forests where this proposed action would take place would thin naturally from mortality-inducing natural disturbances and other processes resulting in dead trees that would decay over time, emitting carbon to the atmosphere. However, in the absence of management actions, forests in the project area would remain at risk from large-scale, high-intensity wildfire due to altered fuel loads and structure. Where projects have occurred that reduced fuel, this risk is reduced. Fire management efforts would continue to be challenged by lack of pre-planned areas to initiate suppression activities. Uncharacteristic high-intensity wildfire in ponderosa pine forests could lead to regeneration failure and conversion to grass or shrubland landscapes, with detrimental effects on long-term carbon storage in the project area.

Alternative 2

The proposed Jackson Mountain project includes commercial forest product removal on approximately 700-800 acres, meadow enhancement on 100-200 acres, and fuels reduction activities on approximately 1,600 acres of the 9,390-acre analysis area. This scope and degree of change would be minor, affecting a maximum of 0.001 percent of the 1,879,000 acres of forested land in the San Juan NF.

In addition, the effect of the proposed action focuses on the aboveground carbon pool that is stored in live woody vegetation, which comprise about 29.9 percent of the total ecosystem carbon stocks of the San Juan (Reinemann et al., 2023). About 24 percent or more of the ecosystem carbon is in mineral soils, a very stable and long-lived carbon pool (McKinley et al., 2011; USDA Forest Service 2015; Domke et al. 2017). Timber harvesting and prescribed burning generally result in a negligible amount of carbon loss from the mineral soils typically found in the United States, particularly when operations are designed in a way that minimizes soil disturbance (McKinley et al., 2011). Although timber harvest and forest thinning can also affect the carbon stored in the understory and forest floor organic layer consisting of debris in various stages of decomposition, the carbon loss from project actions would be negligible given it is not stable or long-lived and would be replaced within months to a few years with new forest growth.

The wood and fiber removed from the forest in this proposed project would be transferred to the wood products sector for a variety of uses, each of which has different effects on carbon (Skog et al., 2014). Carbon can be stored in wood products for a variable length of time, depending on the commodity produced. Wood can be used in place of other materials that emit more GHGs, such as concrete, steel, and plastic (Gustavsson et al., 2006; Lippke et al., 2011; McKinley et al., 2011). Likewise, biomass can also be burned to produce heat or electrical energy, or converted to liquid transportation fuels that would otherwise come from fossil fuels. In fact, removing carbon from forests for human use can result in a lower net contribution of GHGs to the atmosphere than if the forest were not managed (McKinley et al., 2011; Bergman et al., 2014; Skog et al., 2014). Furthermore, by reducing stand density, the proposed action may also reduce the risk of more severe disturbances, such as insect and disease outbreak and severe wildfires, which may result in lower forest carbon stocks and greater GHG emissions.

Cumulative Impacts for Climate Change:

Climate change is a global phenomenon, because major GHGs3 mix well throughout the planet's lower atmosphere (IPCC 2013). State-wide emissions of GHGs in 2021 were estimated at 126 million metric tons of

CO2e across state sectors (Taylor, 2021). Because local GHG emissions mix readily into the global pool of GHGs, it is difficult and highly uncertain to ascertain the indirect effects of emissions from single or multiple projects of this size on global climate. Any initial carbon emissions during the implementation of the proposed project would have a temporary influence on atmospheric carbon concentrations because carbon will be removed from the atmosphere as forests regrow, minimizing or mitigating any potential cumulative effects. The state of Colorado has put forward the Climate Action Plan to Reduce Pollution (Becker, et al.,2019) which describes three main actions:

1. Mitigate: reduce state-wide greenhouse gas emissions by 26% by 2023, 50% in 2030, and 90% by 2050 from 2005 levels
2. Adapt: Help communities adapt and increase resilience through educating state, regional, local, and community leaders on risks from natural hazards and ecosystem shifts to reimagine Colorado's built environment, embrace new economic opportunities, and encourage immediate collective action
3. Transition Equitably: Mitigate and adapt in an equitable way by building a culture of diversity, inclusivity, and equity into collaborative decision-making processes that foster holistic climate action by centering the voices, needs, assets, and insights of disproportionately impacted communities

The Jackson Mountain project is consistent with this new state-wide policy in that the proposed actions would help increase community and ecosystem resilience against catastrophic wildfire as well as continue to collaboratively make decisions. The largest source of GHG emissions in the forestry sector globally is deforestation (e.g., conversion of forest land to agricultural or developed landscapes) (Pan et al., 2011; Houghton et al., 2012; IPCC 2014). However, forest land in the United States has had a net increase since the year 2000, and this trend is expected to continue, albeit at slower rates than previously projected in the 2010 Resources Planning Act Assessment (Wear et al., 2013; USDA Forest Service 2023). The proposed activities in the Jackson Mountain project would not result in the loss of forest land from the San Juan NF. In fact, forest stands are being retained and thinned to create more logical and effective fuels treatment units, which would reduce the risk from high intensity fire to private land, homes, and infrastructure. The maintenance of diversely aged stands and meadow enhancement would help improve wildlife habitat in the project area. They would also allow for more efficient wildfire response and reduced risk to firefighters and the public by lowering fuel load. The proposed action supports sustainable ecosystems and thereby contributes to long-term carbon uptake and storage (Wiedinmyer and Hurteau 2010).

Reducing stand density in designated areas, one of the goals of this proposed action, is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Joyce et al., 2014). This proposed action is consistent with options proposed by the IPCC for minimizing the impacts of climate change on forests, thus meeting objectives for both adapting to climate change and mitigating GHG emissions (McKinley et al., 2011). Relatively small quantities of carbon would be released to the atmosphere and the short-term nature of the effect of the proposed action on the forest ecosystem are negligible, given that the overall change in condition increases the resistance to wildfire, drought, insects and disease, or a combination of disturbance types that can reduce carbon storage and alter ecosystem functions (Millar et al., 2007; D'Amato et al., 2011).

In summary, this proposed project affects a relatively small amount of forest land and carbon on the San Juan NF and might temporarily contribute an extremely small quantity of GHG emissions relative to state-wide emissions. This proposed action would not convert forest land to other non-forest uses, thus allowing any

carbon initially emitted from the proposed action to be removed from the atmosphere over time as the forest regrows. Furthermore, the proposed project would transfer carbon in the harvested wood to the product sector, where it may be stored for up to several decades and substitute for more emissions-intensive materials or fuels. This proposed action is consistent with the San Juan National Forest Land and Resource Management Plan and makes progress towards achieving the desired conditions of maintaining net-positive carbon storage and promoting habitat for species vulnerable to climate change. The proposed action is also consistent with internationally recognized climate change adaptation and mitigation practices.

3.4 Recreation and the Social Environment

Affected Environment

Presently, there is little quantitative baseline data on the recreation usage patterns within the analysis area. Repeated field-observations, professional judgment, recreation opportunity spectrum (ROS) management prescriptions, Forest Plan direction, and technical reports will serve as the basis for the following analysis.

The Jackson Mountain analysis area receives low to moderate recreation use relative to the rest of the Pagosa Ranger District, with a marked increase during the fall season when big game hunting occurs. Primary vehicle access is via the Jackson Mountain Road (NFSR 037). The Snowball Road (NFSR 646), along with several secondary roads stemming from NFSR 037, provide access to other regions of the analysis area. The Snowball Connector Trail (NFS Trail 818), open to Off Highway Vehicles (OHVs) under 50” in width, offers motorized access to the western portion of the analysis area.

There is one designated trailhead in the analysis area (the Jackson Mountain Trailhead), which is located at the northern terminus of NFSR 037 and services the Turkey Creek Trail (NFS Trail 580). The Turkey Creek Trail is open to OHVs for the first 2.8 miles; the remainder of the 19.4-mile trail is designated as open to non-motorized uses only. There are no additional developed sites or designated NFS trails within the analysis area. Numerous NFS roads which are closed to public wheeled motor vehicle use (Maintenance Level 1) are utilized by recreationists for hiking, biking, and horseback travel.

While there are only two designated system trails within the analysis area, a variety of non-system (user-created) routes are located throughout the Jackson Mountain landscape. Many of these routes have evolved over time through repetitive use (such recurring pedestrian travel on old roadbeds and cattle/game trails), while some were illegally constructed and/or improved and continue to be maintained in violation of federal regulations. Mountain biking and hiking constitute most of the use of these non-system routes.

Hunting, hiking, dispersed camping, mountain biking, off highway vehicle (OHV) use, and driving for pleasure are the primary recreation uses of this area in the spring, summer and/or fall. A limited amount of snowmobiling, cross-country skiing, and snowshoeing occur during the winter. As noted above, the heaviest recreation use occurs during the big game hunting seasons in the late summer/early fall. Dispersed camping along the primary and secondary roads by hunters is popular during this timeframe, as are day hunting, the use of OHVs on systems roads and trails, and hiking. Dispersed camping not associated with hunting has also been growing in popularity in the Jackson Mountain area in recent years.

Three commercial outfitter/guides are permitted to operate within the analysis area. Two permittees provide hunting services, while one offers mountain bike tours.

The Recreation Opportunity Spectrum (ROS)

ROS is a planning system utilized by land managers to classify areas according to the types of recreation opportunities available therein. ROS classifications may range from Primitive inside a pristine Wilderness to Urban in forests adjacent to metropolitan areas, thereby enabling recreation managers to provide a variety of settings for visitors to recreate in, each with their own characteristics and opportunities. The majority of the analysis area is classified as Roaded Natural, which is a setting characterized by a predominantly natural-appearing environment as viewed from sensitive roads and trails, with moderate evidence of the sights and sounds of people. Contact between visitors is typically low to moderate on trails and moderate to high on roads.

Environmental Consequences

Data relating to recreation use is unavailable for the analysis area given their highly dispersed nature. However, through repeated field observation, professional judgment, scientific literature, and anecdotal evidence the consequences of the alternatives on recreation opportunities and experiences may be predicted with a fair degree of certainty, but without quantitative analysis.

Alternative 1: No Action

Under this alternative, ongoing and future activities such as routine road maintenance, recreation use, fire management, and noxious weed control would continue to occur. Forest restoration efforts through prescribed burn treatments and work associated with ongoing vegetation management in the project area will also continue to occur. Recreation opportunities and experiences in the analysis area would remain consistent with their present characteristics and anticipated future trends, but the lack of additional vegetative treatment under Alternative 1 could result in an increased risk of high intensity wildfire which could cause impacts to recreation opportunities and experiences in the analysis area.

Alternative 2

Under Alternative 2, some disruptions and impacts to dispersed recreationists would result from management activities such as tree felling, skidding, fuels mastication, road work, snow plowing, and the presence of log trucks and other equipment on area roads during project implementation. Each of these activities has the potential to negatively affect both the experiences and, to a lesser extent, the opportunities recreationists seek in the Jackson Mountain area, depending on the nature of the recreational pursuits, their timing, and their locations. However, such disruptions would generally be confined to the period of actual project implementation and are not expected to have lasting negative consequences (see discussion below on long-term and indirect effects).

Recreationists most likely to be negatively impacted are big game hunters. Dispersed hunting camps may be undesirable and/or impossible to occupy when project operations are occurring in the vicinity of these areas. Similarly, some areas historically used for hunting purposes may be temporarily impacted by vegetation treatment operations, and as such, some localized displacement of hunters is possible. However, off-forest displacement of hunters (or non-hunting recreationists) is unlikely.

Outfitter/guides permitted within the analysis areas should be able to adjust their activities to accommodate the project work being proposed in this alternative and therefore should not experience measurable disruptions to their operations.

Recreation Opportunity Spectrum (ROS) prescriptions for the analysis area would not require alteration as a result of this alternative, and Forest Plan direction is consistent with the activities proposed in this alternative as relates to recreation resources.

Existing scientific literature on the indirect and long-term effects of vegetative management activities on recreation resources generally offers five conclusions (Gan & Miller 2001, Tarrant et al 1999, McDonald & Stokes 1997, English & Home 1996, Palmer et at 1995, Herrick & Rudis 1994, Jaakko Poyry Consulting 1994, Schroeder et al 1993, Palmer et al 1993, Cordell et al 1990, Palmer 1990, Schweitzer et al 1976).

1) Forest recreationists typically prefer—when offered a choice—environs in which to recreate that are largely undisturbed by human activities.

2) Negative impacts on the experiences of recreationists increase proportionately to the extent of human-induced disturbances, with the coppice method of treatment being the most negatively impacting.

3) Over time, negative impacts from past vegetative treatments on the experiences of recreationists will typically diminish, dissolve, or in some cases become a positive influence on recreation opportunities and experiences.

4) Recreationists are not affected uniformly by vegetative management: long-term undesirable impacts, including those from coppice treatments, will range from none at all to considerable, depending on a variety of user characteristics and treatment methods.

5) Management constraints employed to offset the visual effects of vegetative management generally reduce negative impacts to recreation users and occasionally improve both recreation opportunities and experiences.

Cumulative Impacts:

Past, current, and future foreseeable activities that are impacting recreation opportunities, activities, and experiences in the analysis area include fuels reduction projects, timber sales, livestock grazing, and increasing recreation use of the area. The implementation of this action combined with past, present, or foreseeable future activities, is not expected to have cumulative impacts on the recreation opportunities, activities, and experiences in the analysis area.

3.5 Cultural Resources

Affected Environment

In compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended), 36 CFR 800, and Region 2 Three Forest Programmatic Agreement with the Colorado State Historic Preservation Officer (SHPO) Regarding Vegetation Management Undertakings (2017), the cultural resource specialist conducted a Class I cultural resource literature review of the analysis area. This review examined previous cultural resource survey reports and site records that occurred on lands identified as areas of potential effect (APE) and serves as the preliminary analysis of the current condition of known cultural resources in the analysis area. It provides an overview of known cultural resources in the project APE for ongoing consultation discussions. The Class I survey also serves to identify lands within the analysis area and APE that will require future intensive (Class III) cultural resource surveys prior to any undertakings.

Previous cultural resource surveys documented thirty (30) cultural resource sites and thirty-seven (37) isolated finds within the project area. These include prehistoric camps and lithic scatters, proto-historic/historic culturally modified peeled tree sites and associated camps, historic logging, livestock/ranching and railroad associated features. In addition to these recorded resources, twelve (12) culturally modified peeled tree sites

associated Ute, Apache and/or Navajo people have been noted and/or mapped, but not recorded to state or federal standards or evaluated for National Register eligibility. Of all previously recorded cultural resource sites in the project area, three (3) are eligible for listing on the National Register of Historic Places, twenty-one (21) are not eligible for listing and six (6) remain unevaluated. All previously recorded isolated finds in the project area were fully recorded exhausting any potential for additional information pertinent to the archaeological record and were determined to be not eligible. The twelve unrecorded peeled trees are unevaluated.

Eligible and unevaluated sites within the project APE will be relocated and evaluated for National Register eligibility through additional THPO and SHPO consultation prior to project implementation. These sites will also be avoided and protected during future project implementation. Pending SHPO review and concurrence on these recommendations, this project should have "no adverse effect" on historic properties pursuant to 36 CFR 800.4(d)(1).

Environmental Consequences

Alternative 1

Under the No Action Alternative, no vegetation management or other ground-disturbing activities would take place in the APE as part of this project. Ongoing and future activities, such as routine road maintenance, recreation use, fire management, and noxious weed control would continue to occur under current Forest Plan standards. Forest restoration efforts through prescribed burn treatments and work associated with the Pagosa Area Long-term Stewardship Contract will also continue to occur under previously approved decisions and Forest Plan standards. Therefore, this alternative would have no effects to cultural resources, as previously established avoidance and protection measures would be employed. The lack of additional vegetation treatment under Alternative 1 could result in an increased risk of high intensity wildfire which could cause impacts to cultural resources in the analysis area.

Alternative 2

No effects on cultural resources are anticipated given that project activities would be controlled through application of cultural resource design elements and future Class III (intensive) cultural resource surveys on up to 9,390 acres. Cultural resources will be avoided. No debris piles, landing areas, roads, or skid trails would be constructed within site boundaries. Timber harvesting equipment or other heavy machinery would not be used within site boundaries unless the unit is designated for over-snow operations. All project undertakings identified under Alternative 2 would avoid National Register eligible and unevaluated cultural resources per Section 106 of the NHPA. With adherence to all cultural resource design elements, the proposed action will have "no adverse effect" on cultural resources.

Cumulative Impacts:

Past and future forest management projects have the potential to cumulatively impact cultural resources within the analysis area. Typical vegetation management activities can cause disturbances to or changes in the environment over time that may affect the integrity of cultural resources. However, planned actions undertaken by the Forest Service would require Section 106 compliance work, including cultural resource surveys, consultation, site monitoring and inspections of known or newly identified cultural resources.

Compliance with Section 106 would trigger adjustments in management practices (as appropriate) to ensure that cultural resources are considered, avoided and managed to standard within the project area. Unforeseen or unregulated activities, such as wildfire, off-trail recreation or firewood gathering have a greater potential to

cause impacts to cultural resources. These activities could unintentionally expose sites overtime, causing erosional damage, increase the potential for vandalism or artifact looting, or complete loss of a site. Wildfire could burn cultural resources with combustible materials and fire suppression activities could inadvertently disturb or destroy surface and subsurface features and artifacts. Since any potential impacts to cultural resources within the project APE will be mitigated per the design elements of this project and future Section 106 compliance work, this project, combined with other past, present, and future foreseeable actions, will not cause any cumulative impacts to cultural resources.

3.6 Rangeland Management

Affected Environment

Domestic livestock grazing has occurred within the Jackson Mountain analysis area since the early 1900's. The analysis area is within the Turkey Creek and Snowball Allotments.

Environmental Consequences

Alternative 1: No Action

Under the No Action Alternative, ongoing and future activities, such as routine road maintenance, recreation use, fire management, and noxious weed control would continue to occur. Forest restoration efforts through prescribed burn treatments and work associated with ongoing vegetation management work will also continue to occur. If no additional vegetation management treatments occur, there would be a decrease in the amount of forage produced in ponderosa pine, mixed conifer, and aspen stands over the next 20 years, and over the long term. In the long term (20+ years), there would be a loss of secondary range throughout the analysis area, which would reduce available forage for livestock on the allotment. If there is increased tree mortality and downfall, livestock mobility and distribution within the analysis area would be increasingly restricted. The lack of additional vegetation treatment under Alternative 1 could also result in an increased risk of high intensity wildfire. Wildfires could increase forage and livestock mobility and distribution in some areas but could decreases it in other areas.

Alternative 2

Under this alternative, proposed treatments would increase forage production in the ponderosa pine, mixed conifer, and aspen stands proposed for treatment. A reduction of fuel loading, construction of temporary roads, and reconstruction of roads would improve livestock mobility and distribution within the analysis area.

Some loss of aspen sprouting is expected as a result of herbivory by permitted livestock. Given the normally extensive suckering that occurs with coppice treatments where aspen regeneration has potential, this loss should not compromise regeneration in these areas because: a) there will be an extensive enough area where this treatment occurs, resulting in dilution of the effect of sucker consumption, and b) the resulting increase in production of understory plants in other treated areas due to overstory thinning or removal will provide additional forage and further dilute the effects of grazing.

Cumulative Impacts:

Past, current, and future foreseeable activities that are affecting livestock grazing and rangelands in the analysis area include fuels reduction projects, timber sales, and increasing recreational use of the National Forest with the related disruption of livestock rotations. The proposed actions, combined with these past, present, and foreseeable future activities, could have a minor cumulative impact on livestock grazing and rangelands.

4 AGENCIES AND PERSONS CONSULTED

Local and State Entities and Agencies Consulted

Archuleta County Commissioners
Colorado Parks and Wildlife
Pagosa Springs Chamber of Commerce
Colorado State Historic Preservation Officer

Tribes Consulted

Jicarilla Apache Nation
Kewa Pueblo
Navajo Nation
Ohkay Owingeh
Pueblo of Acoma
Pueblo of Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Nambe
Pueblo of Picuris
Pueblo of Pojoaque
Pueblo of San Felipe
Pueblo of San Ildefonso
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Taos
Pueblo of Tesuque
Pueblo of Zia
Southern Ute Indian Tribe
The Hopi Tribe
Ute Mountain Ute Tribe
Zuni Tribe

Other Potentially Interested Individuals and Groups Consulted

All landowners within ½ mile of the analysis area (approximately 248 individuals)

San Juan River Village Property Owners Association

Other interested individuals (approximately 110 individuals requesting to be on mailing list)

All Special Use Permit holders within the area (approximately 15 individuals/businesses including outfitter/guides, range permittees, utility companies, and other special use permit holders)

Local trail/recreation groups

Local timber producers

San Juan Headwaters Forest Health Partnership

San Juan Citizens Alliance

US Forest Service ID Team

Sara Brinton – NEPA Coordinator/Botany
Adam Tlachac – Forestry
Lindsey Smith – Archaeology
Kenar Houghton – Climate
Anthony Garcia – Fisheries and Wildlife Biology
Paul Blackman – Recreation/Social Environment
Kelly Tuten – GIS
John Garcia – Range

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