U.S. DEPARTMENT OF AGRICULTURE

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Austin Project
Draft Environmental Impact Statement

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PROPOSAL INFORMATION

Purpose and Need

Introduction and Background

Regulation changes since the latest scoping period have prompted the Malheur National Forest to prepare this environmental impact statement in compliance with the 2025 USDA NEPA regulations (7 CFR Part 1b, interim final rule published in the Federal Register on July 3, 2025). This rule modifies the USDA's NEPA implementing regulations in response to the Council on Environmental Quality's rescission of its own NEPA regulations. Austin Project is also moving forward as an emergency action[1] under Secretary's Memorandum 1078–006 emergency situation determination (ESD) under section 40807 of the Infrastructure Investment and Jobs Act (IIJA).

Under this emergency authority, applicable activities under the Austin Final Environmental Impact Statement and Record of Decision (when released) are not subject to pre-decisional administrative review commonly known as "objections" (Consolidated Appropriations Act of 2012 (Pub. L. 112–74) as implemented by Subparts A and B of 36 CFR part 218). Over 50 percent of Austin planning area falls within the 66,940,000 acres of National Forest System lands rated as very high or high wildfire risk.

The purpose and need of this project and applicable proposed activities include lowering wildfire intensity and reducing wildfire risk. This project is hereby determined to be an emergency situation, as defined by the Infrastructure Investment and Jobs Act. Other relevant Federal and State laws and regulations apply to this project. See Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy.

This document discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action. Additional documentation, including more detailed analyses of planning area resources, may be found in the project planning record located at Blue Mountain Ranger District, John Day, Oregon. This draft environmental impact statement incorporates by reference all appendices and the project record.

Austin planning area is approximately 78,200 acres: 75,900 acres are National Forest System lands managed by the Malheur and Wallowa-Whitman National Forests and the remaining 2,300 acres include private inholdings and lands administered by Oregon Parks and Recreation Department or Bureau of Land Management (see Austin Appendix B – Maps, Map 1). Austin planning area includes several management areas, which are described in detail in the Malheur Forest Plan (USDA Forest Service 1990a) and the Wallowa-Whitman National Forest Land and Resource Management Plan (USDA Forest Service 1990d). Austin planning area encompasses Bridge Creek-Middle Fork John Day River Watershed and the headwaters of Middle Fork John Day River.

The planning area is a diverse landscape with large percentages of cold and dry upland forest potential vegetation groups. It also includes the "humongous fungus," meadows, critical habitat for Middle Columbia River steelhead and Columbia River bull trout, over 600 miles of road,

[1]Since the Forest Service has its own program called ESD (36 CFR 218.21), to prevent confusion between the two, the Forest Service refers to any designation under IIJA section 40807 as an emergency action determination (EAD).

historic properties that include pre-contact and historic components, and dispersed and developed campsites.

The area ranges in elevation from approximately 4,100 feet along Middle Fork John Day River in the center-west portion to approximately 6,600 feet on ridgetops in the southeast portion that extend onto Wallowa-Whitman National Forest.

Table 1. Malheur and Wallowa-Whitman National Forest Plan management areas within Austin planning area. See Austin Appendix B – Maps, Maps 2 and 3.

Management Area	Acres[2]	Malheur and Wallowa-Whitman Forest Plan Goals
Malheur National Forest – General Forest (management area 1)	34,070 acres	Manage for timber production and other multiple uses on a sustained yield basis.
Malheur National Forest – Rangeland (management area 2)	Included in management area 1	Manage for livestock forage production and other multiple uses on a sustained yield basis.
Malheur National Forest – Riparian Areas (management area 3B) / Riparian Habitat Conservation Area	6,530 acres	Manage to protect or enhance riparian dependent resources in watersheds supporting anadromous fish. Acres for this management area are measured using riparian habitat conservation area buffers.
Malheur National Forest – Developed Recreation (management area 12)	6 acres	Manage for developed recreation opportunities.
Malheur National Forest – Old Growth Habitat (management area 13)	7,281 acres	Provide “suitable” habitat for old growth dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities.
Malheur National Forest – Visual Corridors (management area 14F – foreground and 14M – Middleground)	26,680 acres	Manage corridor viewsheds with primary consideration given to their scenic quality and the growth of large diameter trees. Visual quality objectives of retention, partial retention, and modification will be applied while providing for other uses and resources.
Wallowa-Whitman National Forest – Timber Production Emphasis (management area 1)[3]	26 acres	Manage for wood fire production while providing relatively high levels of forage and recreational opportunities.

Public input received during project development was considered while developing the proposed action. Common themes from public input included comments on road system management; level and extent of upland restoration treatments; providing economic benefits to local economies; aquatic and meadow restoration; concern about use of the emergency authority; and improving wildlife habitat.

[2] Some management areas overlap, so the total acreage is greater than the planning area.
[3] Wallowa-Whitman National Forest area included in proposed prescription burn blocks.

This draft environmental impact statement tiers to the Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan), Final Environmental Impact Statement, and Record of Decision; and incorporates by reference the accompanying land and resource management plan, as amended (USDA Forest Service 1990a, 1990b, and 1990c).

Management of resources on National Forest System lands is also based on several federal laws and regulations, including the Multiple-Use Sustained Yield Act of 1960; the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by National Forest Management Act of 1976; National Environmental Policy Act of 1969; Endangered Species Act 1973, as amended; Clean Water Act, as amended, 1977, 1982; Clean Air Act, as amended, 1990; National Historic Preservation Act, 1966 as amended, 1976, 1980, 1992; Migratory Bird Treaty Act, 1918; Bald and Golden Eagle Protection Act as amended, 1978, and Executive Orders. See Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy.

Purpose and Need

The purpose and need were developed by comparing management objectives and desired conditions in Malheur Forest Plan to existing conditions in the planning area. Where Malheur Forest Plan information was not explicit, best available science and local research were used in a collaborative setting with stakeholders.

The purpose of the project is to address the emergency situation in the Austin planning area to prevent uncharacteristically severe wildfire. We are proposing to mitigate fire risk and protect public health and safety in the following ways.

Promote forest conditions that allow for reintroduction of fire upon the landscape where naturally occurring fire has been excluded. Create conditions conducive to firefighter and public safety to improve ability to protect public and private land interface, and natural resource values. Specifically:

- Lower fire behavior intensity (reduce crown fire potential and lower flame lengths).
- Increase the likelihood of lower intensity fire behavior and effects by managing distribution and arrangement of natural and activity-created fuel loadings.
- Provide safer ingress and egress routes for firefighters and public within wildland urban interface.

Maintain and improve diverse forest composition and stocking levels to promote landscape resiliency within a complex disturbance regime of wildfire, drought, insects, and diseases. Specifically:

- Transition forest structural stages within the most prominent potential vegetation groups to better reflect historic ranges, including creation of forest openings.
- Develop and maintain vigorous and healthy forest stands that will be resilient to natural disturbances, including restoration of fire to its natural role in the ecosystem.
- Promote forest species composition that better reflects historical ranges to reduce moisture stress across the landscape and shift to more disturbance-tolerant species.
- Promote expansion of hardwood species including aspen and mahogany, and species that provide culturally significant foods (such as huckleberry, cous, and riparian shrubs).

Contribute to the region's social and economic vitality. Specifically:

- Provide a variety of wood products (for example, merchantable sawtimber, post and pole, and biomass).

Improve watershed function, resiliency, and aquatic habitat in highly altered stream networks by reestablishing more characteristic streamflow patterns and maintaining or enhancing water quality, riparian vegetation communities, and elements of aquatic habitat. Specifically:

- Improve valley bottom conditions, channel complexity, and hydrological connectivity between stream channels and floodplains. Retain water on the landscape for longer durations.
- Promote summer rearing habitat for juvenile fish and support adult spawning conditions for listed threatened species (Middle Columbia River steelhead and Columbia River bull trout) and aquatic management indicator species (spring Chinook salmon).
- Improve conditions that promote healthy and vigorous riparian hardwood and sedge communities.

Existing and Desired Future Condition

The following paragraphs describe the gap between existing and desired conditions that helped the Forest develop the purpose and need above. Existing conditions are provided for two additional resources that were established as issues based on scoping comments received: wildlife habitat and roads. Existing conditions shown here are used as a baseline for discussion.

Forest Fuels Conditions

The historical fire regime in Austin planning area was characterized by frequent mixed-severity fires. Conditions within the planning area show fire return intervals ranged between 11 and 18 years in dry pine sites and 12 to 21 years in mixed conifer sites (Johnston et al. 2017).

Approximately 90 percent of Austin planning area falls within fire regime I condition class 3, a deviation from its historical condition class 1. Condition class 3 is characterized by high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances. The factors that have contributed to minimizing fire spread throughout the planning area have led to this shift in vegetation characteristics and fuel composition.

Past forest practices (including active fire suppression, grazing, and timber harvest) have changed composition and structure of vegetation in the planning area. Existing conditions include increases in tree density, encroachment of shade-tolerant tree species, and high loss of shade-intolerant tree species.

Fuel loading, in portions of the planning area not treated in the last 20 years, has increased over historical levels: from 1 to 4 tons per acre in ponderosa pine stands and 8 to 24 tons per acre in fir and lodgepole stands, to approximately 1 to 48 tons per acre throughout the planning area. Past practices manipulated fuel conditions that lead to fire behavior intensity above what was observed historically.

Due to current forest density, wildfire in almost any location within the planning area would burn with high severity. Current fire behavior conditions under 97th percentile weather conditions are expected to have flame lengths of 4 to 8 feet with some areas exceeding 11 feet. Tree mortality would vary by species and wildfire intensity, but on average it is expected that 76 percent of trees 21 inches or larger diameter at breast height (averaged across all species) would die.

Potential danger to firefighters would necessitate using indirect methods that would increase area burned and restrict firefighters' ability to safely protect private property and ensure public safety. It could also affect public access to major roadways needed for ingress and egress.

Desired condition is an ecosystem that would thrive with recurring disturbance of managed wildfire and prescribed fire, which would decrease probability of uncharacteristic catastrophic wildland fire occurring within the planning area. Specifically, ground, surface, ladder, and aerial fuels would decrease.

Transitioning fire (from surface to crown) would be moderated with crown bulk density reductions and an increase in canopy base heights. Areas would have a fire resilient species composition (Juran 2017). Fire-adapted ponderosa pine and western larch, which were historically dominant in this area, would be dominant. Stimulation of aspen growth and other fire-adapted vegetation would contribute to this ecosystem's ability to flourish.

Fire regime I, condition class 1 represents fire behavior in the desired condition. This would be generally low-intensity surface fire, which results in less than 25 percent replacement of dominant overstory vegetation, to mixed-severity fire in moister sites. It can also include mixed-severity fires that replace up to 75 percent of overstory (Rollins 2009). Moving toward desired conditions, with fire reestablished to its natural role in the ecosystem and strategic road treatments along designated roadways, would create a safe environment for firefighters, forest visitors, and the public.

Less biomass would be available to burn under a wildfire, thereby reducing potential health hazards from smoke emissions which would benefit the public and firefighters. Fewer greenhouse gases would be released from the planning area during a wildfire event which would not significantly contribute to climate change (Grant County 2013, USDA Forest Service 2017b).

Forest Composition and Stocking Levels

Past management actions and wildfires have altered forests in the planning area from historical conditions, resulting in a current deficiency of stand initiation[4] and old forest structural stages across forest types. This is particularly true in ponderosa pine-dominated open forests with large trees. Past management actions have also resulted in higher density stands and higher proportions of grand fir, Douglas-fir, and lodgepole pine when compared to historical conditions.

Dry and moist upland forest are very different with respect to inherent productivity, and currently they are also very different with respect to structural and compositional attributes. Dry forests are typically less dense, dominated by ponderosa pine (or on the more productive sites, by ingrowth of grand fir), and tend to have a single canopy layer.

[4] Stand initiation refers to the structural class at which growing space is re-occupied by vegetation following a stand-replacing disturbance (O'Hara et al. 1996).

Moist forests are much denser, dominated by grand fir, and tend to have multiple canopy layers. However, because all sites historically experienced similar fire disturbance regimes (Johnston et al. 2017), this tended to equalize stand biomass and species composition across the landscape. Ponderosa pine and mixed conifer forests were very similar with respect to basal area and, to a lesser extent, species composition (Johnston 2017).

Desired conditions consist of forest structural stages that more closely reflect historical ranges, including old forest structures and wildlife habitats. Desired conditions also include stands where density and species composition better reflect historical conditions, which includes stands of lower density and a higher proportion of shade-intolerant species as described in Johnston 2017.

Aspen

Around 55 aspen stands have been documented within Austin planning area that range from individual trees to small stands less than 5 acres with a few stands being over 10 acres. Most stands are in poor condition and high risk of loss due to a combination of conifer encroachment, high ungulate browsing, lowering of water table, fire suppression, and fences in disrepair. Many stands lack a midstory or healthy suckering necessary to ensure future health and stand expansion.

Around a quarter of aspen stands were previously treated and fenced in Crawford Aspen project (USDA Forest Service 2012a) and some of these are showing signs of improved health including prolific suckering and have a few signs of a midstory developing, though most still lack a midstory. Some stands have conifer that were not removed, and new conifer seedlings are being established.

Malheur Forest Plan standard 57 (USDA Forest Service 1990a, page IV-31) includes direction to maintain or enhance quaking aspen stands using clear-cutting and prescribed fire as principal means of regeneration where appropriate and to protect root sprouts where needed and practical.

Many aspen stands are also located within management area 3B anadromous riparian areas (IV-62 to IV-69), which includes standards to improve forage, hardwoods, meadows, and riparian function which benefit big game, birds, and many other wildlife species.

Desired conditions include healthy aspen stands, with improved regeneration and vigor, three age classes, and prolific suckering. Stands would have expanded riparian habitat with functioning hydrology and moisture would be retained in the stand soil (no incised channels) (Swanson et al. 2010).

Mountain Mahogany

Existing condition includes scabland flats and upland dry meadows located throughout the planning area which provide unique habitat. Some of these sites have shallow rocky soils, mountain mahogany, and other forage and browse species important for big game habitat. They are currently encroached by juniper and ponderosa pine.

Desired future conditions are reduced juniper and ponderosa pine encroachment, and increased mountain mahogany, other winter browse species, and native grasses (USDA Forest Service 1990a).

Social and Economic Vitality

Forest Products

The existing condition includes a local economy supported by the production of forest products which plays an important role in employment and revenue. Timber harvest has decreased since the 1990s and when operating there are two sawmills and one post and pole facility in Grant County.

Desired condition is to provide forest products to help maintain existing lumber and forest product infrastructure and support local employment, providing for community stability. Malheur Forest Plan includes direction to provide a sustainable flow of timber and associated forest products at a level that would contribute to economic stability and provide an economic return to the public (USDA Forest Service 1990a, Forest goals 24-26, page IV-2). This would also comply with Executive Order 14225 (Immediate Expansion of American Timber Production) to increase timber harvesting on federal lands to boost domestic supply, create jobs, and reduce wildfire risk.

This action responds to the goals and objectives outlined in the Malheur Forest Plan and helps move the planning area toward desired conditions described in that plan (USDA Forest Service 1990a).

Watershed Condition

Historical land use and management actions implemented before development and application of watershed best management practices altered watershed conditions, processes, and functions. Impacts of season-long livestock grazing, channelization, channel straightening, irrigation diversions, conversion of wetlands to hay fields and pastures, railroad construction, roading, timber yarding, old growth and large tree harvest, beaver trapping, stream cleaning, and wildfire suppression resulted in changes to how water moves through the landscape.

Valley Bottom Conditions, Channel Complexity, and Hydrological Connectivity

Existing conditions are a product of previous human disturbances, current land use, forest management, and climate. The natural balance between the water cycle and the landscape has been interrupted.

Streamflow in low gradient streams is highly altered. Base flows, annual high flows, flows during uncommon high runoff events, and timing of flows are affected by the altered conditions. These conditions are disrupting sediment transport and deposition processes and channel recovery in the planning area. Including contributing to more erosive flows downstream, limited in-channel storage areas, stream entrenchment and disrupted stream channel-floodplain connectivity, conifer encroachment, modified seasonal flow patterns, and increased solar radiation due to reduced shade.

Many of the streams in this planning area have roads on one or both sides that focus flows within the stream channel, resulting in over-widening or channel incision. Wide and shallow streams are prone to increases in stream temperature due to high surface area to volume ratio and provide little habitat for fish, due to lack of depth. Perched culverts also lead to stream downcutting and incising, and undersized culverts further these impacts by concentrating and increasing flow; both occur within the planning area.

Desired conditions include stream-wetland-floodplain corridors and complexes that are in balance. Stream channels are less constrained and more connected to their floodplains with characteristics that provide the complexity (e.g., sinuosity, woody debris, beaver dams) needed to balance energy and sediment supply, capture and store water for slow release, and regulate stream temperature.

Water Quality

Water quality in headwater streams in the planning area is generally good. However, streams in the planning area are listed as impaired under the Clean Water Act for temperature. Temperature data indicate that streams in the planning area do not meet temperature requirements for bull trout or Middle Columbia River steelhead during summer months.

Stream temperatures in Austin planning area are elevated because natural hydrological processes in this physiographic region are highly altered. Floodplain storage is reduced because snowmelt and other runoff leave the landscape too fast due to altered channel conditions. In addition, floodplain storage capacity is reduced due to human disturbance. Entrenched channels reduce floodplain storage capacity, lower the water table, and reduce availability of water for riparian plant species.

Reduced amounts of in-channel wood allow accelerated runoff and loss of in-channel storage zones that both slow streamflow and cool it during passage. Native riparian species are no longer present with vigor and in abundance typical of undisturbed site potentials. This array of conditions and altered processes resulted in past channel widening which affects other processes.

Shifts in riparian plant species affect diversity of dead vegetation found in streams. Shade is reduced where streamside vegetation has been converted, usually as a result of riparian disturbance, to forbs and shrubs typical of upland areas or where potential for shade has been impacted by ungulate browsing.

Drier conditions allow conifer encroachment. Conifers have encroached on valley floors and provide shade, but their presence, excluding spruce, is often indicative of lowered water tables. In addition, encroaching conifers likely reduce base or summer streamflow and contribute to warmer water temperatures.

Vegetation on outer portions of riparian habitat conservation areas above toeslopes is usually similar to that on adjacent hillslopes. Trees immediately above toeslopes may have extended their roots into the valley and may also be accessing shallow ground water from the valley. Conifer roots often access the lowered water table, which would normally sustain riparian growth during summer when soil water is reduced. Lowered water tables indicate that hydrological processes are not functioning characteristically and other stream functions, such as providing fish habitat, are likely compromised. The presence of roads at or below the toeslope would likely limit root expansion.

Construction of roads, including historical railroad grades, has contributed to watershed alteration in ways similar to those described above. Partially benched (cut-and-fill[5]) road segments constrain meander belts and floodplains of streams. Roads intercept subsurface soil water, preventing it from reaching floodplains and streams and contributing to reduced late

[5] For more information about cut-and-fill road segments see https://www.researchgate.net/figure/A-typical-cut-and-fill-road-cross-section-and-features-The-dashed-lines-indicate-the_fig1_222529905.

season flows. Roads may accelerate delivery of overland flow to valley floors, maintaining overly widened or straightened stream channels or contributing to ongoing erosion. Roads in riparian areas reduce productive area for growing trees for large wood recruitment to the stream channel. In some locations, they may reduce potential stream shade. Road surveys indicate that few riparian roads in Austin planning area are currently delivering sediment to streams.

The desired condition for water temperature is to meet the standard defined by Oregon Department of Environmental Quality under the Clean Water Act (USDA Forest Service 1990a, Forest-wide standard 117). The Oregon temperature standard incorporates several criteria related to fish species, life history, season, or type of use to describe the specific aquatic life beneficial use. When temperature meets the Oregon Department of Environmental Quality standard, the water quality assessment category would change to reflect improvement. The short-term desired condition is for current water temperature to be maintained or reduced.

Desired future conditions are stream temperatures that are appropriately moderated by natural hydrological processes. Enabling capture and storage of cold water in the floodplain for late season release and higher water tables, robust riparian sedge and hardwood communities that provide shade in the summer months, and channel complexity with deep pools and undercut banks that provide cool/cold water temperatures that meet thermal requirements for adult and juvenile salmonids.

Aquatic Species Habitat

Legacy effects to aquatic habitat from past timber harvest, over-grazing, beaver removal, and road and railroad construction include reductions in shade and bank-stabilizing wetland vegetation; streambank alteration; and increases in width-to-depth ratios and fine sediment levels. This impacted fish habitat by increasing water temperatures and decreasing habitat complexity, pool formation, and instream habitat availability (NMFS 2009, Middle Fork John Day IMW Working Group 2017).

Improved management practices on both private and National Forest System lands have resulted in improved aquatic conditions; however, most streams have not returned to pre-disturbance conditions or achieved desired conditions. Historical timber harvest and railroad construction in Austin planning area removed large trees from most riparian areas and, in some cases, from the streams themselves.

Railroad grade construction for timber harvest generally followed drainages and streams to access upland areas and avoid steep climbs. A total of 88 miles of historical railroad grade is located within riparian habitat conservation areas (approximately 38 miles in category 1, 8 miles in category 2, and 42 miles in category 4). Many of these railroad grades were converted to roads following the appearance of log trucks. These legacy features continue to cause habitat degradation.

Abandoned spur railroad berms and replacement roads limit the channels' ability to meander, prevent potential large woody debris from entering the streams, and disconnect streams from their floodplains. Long-term monitoring of effects from management activities on riparian and stream conditions has demonstrated that while there has been an improving trend in some metrics, most habitat metrics in Middle Fork John Day basin are still moderately to highly departed from reference conditions (Saunders 2021).

Existing conditions are described by resource managers using several indicators of aquatic habitat that are associated with management objectives defined in the Malheur Forest Plan and amendments. When meeting objectives, pool frequency and depth, substrate type, channel shape (ratio of width to depth), bank stability, large wood recruitment, and water temperature are sufficient to meet the needs of aquatic organisms, particularly Middle Columbia River steelhead and bull trout. Data indicate that many features of aquatic habitat are not currently meeting those objectives.

Desired conditions include system connectivity and complexity that enable fine sediment to be captured in ways that provide medium for development of nutrient-rich soils in floodplains and cobble and gravel substrates that provide habitat for macroinvertebrates, spawning, and early life stages of fish. Stable and undercut streambanks, deep pools, large wood inputs, and beaver dams provide diverse aquatic habitat features.

Quality pools would be present in sufficient number to increase juvenile salmonid and rearing habitat. Existing valley confinement and floodplain encroachment would be reduced or removed. There would be improved watershed processes at all scales to maintain and promote rearing and spawning habitats for Endangered Species Act-listed species, including Middle Columbia River steelhead and Columbia River bull trout, and all aquatic management indicator species including adult and juvenile spring Chinook salmon.

Riparian Vegetation

Existing conditions include declining riparian hardwood and sedge communities, lodgepole-encroached meadows, and high conifer density within the riparian habitat conservation areas which exacerbate fuel loading and wildfire activity. The existing vigor and complexity of riparian vegetation communities is reduced. The composition of riparian vegetation has shifted in response to altered stream channel and floodplain conditions. Vigor, abundance, and species of riparian vegetation have been impacted by season-long grazing and early management practices that led to altered channels and disconnected floodplains, including railroading and roading, which were focused in accessible and productive valley bottoms.

As the water table dropped following entrenchment, upland conifers encroached on floodplains. They now grow where roots access relatively abundant water and likely reduce the amount of water available for streamflow, especially during late summer.

Desired conditions include appropriate species composition and ratios of conifer and hardwood trees; shrub communities for each plant association; riparian hardwood communities that support beaver needs, and provide instream wood, detritus, and shade; and reduced conifer densities and canopy cover increasing soil moisture. Riparian forests, especially individual trees within one-half to three-quarters tree length of the stream channel, produce large woody debris for streams where it creates critical habitat features for aquatic species. These conditions would help direct peak flows out of channels and help store more water in floodplain water tables, further improving health and vigor of riparian vegetation, expanding hardwood and sedge communities and provide habitat for fish and wildlife.

Wildlife Habitat

Existing health and vigor of many unique and important areas, such as aspen stands, riparian areas, and groundwater-dependent ecosystems, are declining in the planning area.

Desired conditions consist of diverse vegetation communities with increased habitat biodiversity, and improved density and vigor. Wildlife connectivity corridors would connect as many late and old structure stands and management area 13 dedicated old growth as possible in at least two directions within the planning area and to adjacent old growth or late and old structure stands in neighboring planning areas. Desired conditions for management area 13 old growth network include appropriately sized dedicated and replacement old growth stands, as well as appropriate distribution of dedicated old growth stands based on Malheur Forest Plan standards for Pacific marten and pileated woodpeckers across the planning area. Dedicated old growth stands would have characteristics associated with suitable old forest habitat including mature large and old trees, downed wood, and snag habitat.

No Action Alternative

Under the no-action alternative, current management plans would continue to guide management of the planning area. No upland restoration, unique habitat restoration, watershed and fisheries restoration, hazardous fuels treatments, prescribed burning, road activities and road system changes, or forest plan amendments would be implemented to accomplish project goals. See more details under Issues Considered for Analysis.

Proposed Action

The Forest Service is proposing to move forest stands and riparian areas toward resilient conditions and restore fire-adapted ecosystems, thereby improving forest landscape resiliency and overall conditions of the watershed.

Proposed activities include upland restoration; prescribed burning and management of unplanned ignitions; watershed and fisheries restoration; and unique habitat restoration. The proposed action also includes forest plan amendments to the Malheur Forest Plan necessary to address the purpose and need.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences to make the following decisions:

- To select no action or one of the action alternatives that has been considered in detail, or
- To modify an alternative analyzed in detail. A modified alternative must be a mix of proposed activities covered in the Austin Project analysis.
- To identify which project design criteria, best management practices, and mitigation measures would apply to the selected alternative.
- Whether or not to amend the Malheur Forest Plan and whether the amended language would affect the plan's inherent capability of meeting substantive requirements in the 2012 planning rule.
- Any monitoring or monitoring plans which would be approved as part of the decision.

Vegetation Treatments

Upland Restoration Activities

Of approximately 35,946 acres of upland restoration activities proposed, there are 27,230 acres proposed for commercial thinning, 7,998 acres for noncommercial treatment, and 718 acres for seed tree regeneration. See Austin Appendix B – Maps, Maps 9 and 10.

The Austin Project proposes upland restoration activities to promote landscape resiliency within a complex disturbance regime of wildfire, drought, insects, and diseases. Treatments in this category include dry forest ponderosa pine thinning, mixed conifer forest thinning, and seed tree regeneration. See below for more detail on these silviculture treatments. All proposed silviculture activities have potential for mechanized treatment.

Grand and Douglas-fir trees 21 inches or larger diameter at breast height would be removed to the extent that all elements of the silviculture prescription are met, requiring a forest plan amendment (see section below to Remove Trees 21 Inches or Larger Diameter at Breast Height for more detail). All other tree species 21 inches or larger diameter at breast height would be retained. Upland restoration treatments would retain old and large trees as defined by the Malheur Forest Plan and best available science guidelines for identification (Van Pelt 2008, and Johnston and Lindsay 2022).

The proposed action would remove dead and down lodgepole pine across dry forest ponderosa pine and mixed conifer forest types up to 20 inches diameter at breast height where mountain pine beetle activity has resulted in lodgepole pine mortality.

Two lodgepole pine snags per acre of the largest size class would be retained to improve wildlife habitat. All snags of other species, snags larger than 20 inches diameter at breast height, and green tree replacements would also be retained. Live lodgepole removal would follow basal area specifications in the dry forest ponderosa pine type and leave-tree specifications in the mixed conifer forest type.

In riparian habitat conservation areas, noncommercial thinning would be limited to 9 inches diameter at breast height. Material could be skidded from upland treatments through riparian habitat conservation areas to roads at designated stream crossings. Commercial removal from riparian habitat conservation areas would occur where commercial units are adjacent to previously completed aspen treatments. In addition, where road access to upland units is within riparian habitat conservation areas, outer riparian habitat conservation area above these roads would be commercially treated.

Vegetation treatments are proposed within riparian habitat conservation areas, wildlife connectivity corridors, visual corridors (management area 14), and old growth (management area 13). Some treatments in these areas require a project-specific forest plan amendment (see Proposed Malheur Forest Plan Amendments) and project design criteria (Austin Appendix C – Project Design Criteria).

Dry Forest Ponderosa Pine Forest Type

Of approximately 16,132 acres treated in this forest type, 14,808 are proposed for commercial thinning and 1,324 for noncommercial treatment. Restoration in dry forest ponderosa pine would include thinning stands to recommended basal area for the specific site. Thinning activities may

include commercial thinning, removal for other forest projects, mastication, noncommercial thinning, or biomass removal.

Commercial thinning incorporates retaining single trees with clumps of trees and would create openings to replicate historical tree spatial patterns with a target residual basal area ranging from 40 square feet per acre to 60 square feet per acre to balance restoration objectives with future timber supply objectives. This basal area is based on plant association, management area, elevational gradient, aspect, and soil composition (See Austin Appendix A – Activity Tables for more information).

Large trees harvested may be sold for commercial product or used for other forest projects including tree tipping for large wood placement in riparian restoration projects or other habitat improvement needs. Old trees, early seral trees 21 inches or larger diameter at breast height, healthy early seral trees, and clumps of late seral trees would be retained. Noncommercial treatments would occur in areas where most trees are not of commercial size but stand conditions provide ladder fuels, species composition, and stems per acre that are not conducive to future healthy forests.

In riparian habitat conservation areas, portions of any commercial thinning units overlapping inner riparian habitat conservation areas (see Table 2) would be identified as skips or noncommercial thinning. Noncommercial thinning would be limited to 9 inches diameter at breast height. No commercial thinning, piling of activity or natural fuels, or mastication would occur within inner riparian habitat conservation areas.

In wildlife connectivity corridors, basal area target would be within the top one-third of site potential (approximately 60 square feet per acre) and would leave approximately 15 percent of each unit unthinned in clumps or skips to meet connectivity standards.

Activity fuels treatments include piling of activity and natural fuels, burning of piled material, and underburning (see Austin Appendix A – Activity Tables for more information). All commercial and noncommercial treated areas would include prescribed burning to reduce surface and ladder fuels and help restore fire back to the landscape.

Mixed Conifer Forest Type

Of approximately 19,096 acres treated in this forest type, 12,422 are proposed for commercial thinning and 6,674 for noncommercial treatment.

Restoration in the mixed conifer stands would include the same activities as those in the dry forest ponderosa pine stands with the following variations:

Commercial and noncommercial thinning would be based on leave-tree requirements as described in the draft Austin silviculture prescription (USDA 2023b).

Implementing this prescription may create openings. Openings larger than 2 acres would be regenerated with appropriate early seral species following requirements of the National Forest Management Act (see silviculture consistency review in Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy).

Activity fuels treatments include piling of activity and natural fuels, burning of piled material, and underburning. Prescribed fire would follow mechanical treatments to reduce surface and ladder fuels and help restore fire back to the landscape.

Winter Shading Treatments

Upland restoration treatments would be extended to the forest edge adjacent to the highway and into portions of riparian habitat conservation areas to reduce winter shading and black ice formation along approximately 2.1 miles of U.S. Highway 26 due to safety concerns (See Austin Appendix B – Maps, Map 10).

Trees between Bridge Creek and U.S. Highway 26 impact shade on the highway. Winter shading treatments include commercial removal of byproduct (approximately 60 acres) up to 25 feet from Bridge Creek on north-facing slopes. Additionally, noncommercial treatments within the 25-foot buffer and within the U.S. Highway 26 right-of-way on the north side of the stream (between the stream and the road) would fell and leave trees up to 9 inches diameter at breast height to meet coarse wood objectives in addition to trees greater than 9 inches diameter at breast height that do not have old growth characteristics to meet large wood riparian management objectives. Riparian management objectives would be met prior to any commercial removal and commercial removal would not occur between U.S. Highway 26 and Bridge Creek.

Seedtree Regeneration Harvest

There are approximately 668 acres of seedtree regeneration harvest proposed for commercial removal.

Seed tree regeneration harvest would occur in overstocked mixed conifer stands where early seral species have mostly died out due to competition stress. The goal would be to increase abundance of early seral species such as western larch, ponderosa pine, and western white pine through natural regeneration of these species and removal of late seral species. These treatments would occur adjacent to previous regeneration harvest units.

Commercial removal and noncommercial thinning would be based on leave-tree requirements as described in the draft Austin silviculture prescription. Old trees, early seral trees 21 inches or larger diameter at breast height, and healthy smaller early seral trees would be retained.

Activity fuels treatments would include mastication, piling of activity and natural fuels, burning of piled material, and underburning. The proposed action would follow mechanical treatments with prescribed fire to reduce surface and ladder fuels, help restore fire back to the landscape, and create a seed bed. Natural regeneration would be monitored to ensure restocking, and if adequate restocking does not occur, planting with appropriate early seral species would follow to meet the requirements of the National Forest Management Act (see Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy).

Dixie Campground Fuels Reduction

Of approximately 35 acres treated, 18 acres are proposed for commercial thinning and 17 acres for noncommercial. This treatment includes approximately 4 acres of riparian habitat conservation areas along one headwater tributary of Bridge Creek. Noncommercial thinning of grand fir up to 11 inches diameter at breast height would occur, as well as removal of young (less than 150 years old) grand fir 21 inches or larger diameter at breast height with Indian Paint fungus.

Dixie Campground and surrounding areas have a high level of mountain pine beetle infestation. Dead and dying lodgepole pine pose safety and fuels hazards in the campground area. The proposed action would commercially remove live and dead lodgepole up to 20 inches diameter at

breast height. Lodgepole may be used for aquatic restoration, cut and stacked for campground firewood, or piled and burned.

Unique Habitat Restoration

Of approximately 698 acres of unique habitat restoration activities proposed, there are 393 acres proposed for commercial thinning and 305 acres for noncommercial treatment.

Habitat restoration prescriptions would be designed to maintain or enhance important wildlife habitat types occurring in aspen and mountain mahogany (See Austin Appendix B – Maps, Maps 9 and 10).

Aspen

Of approximately 207 acres treated in this unique habitat type, 82 acres are proposed for commercial thinning[6] and 125 acres for noncommercial treatment. Commercial aspen treatments would occur both inside and outside of riparian habitat conservation areas. Removal of grand and Douglas-fir 21 inches or larger diameter at breast height would also occur.

Encroaching conifers may be commercially removed, tipped, felled, or girdled approximately 150 to 200 feet from an aspen stand's perimeter to reduce competition for light and water and allow for aspen regeneration and expansion. Western larch would be retained in moderate to low densities as it produces less shade than other conifers. We may also retain some ponderosa pine with high ground-to-crown height because the shade produced does not typically fall within the aspen stand. Conifers felled or tipped within these stands may be used for stream or floodplain restoration. We may use fencing, jackstrawing[7], or hinging of conifers to reduce browse pressures from domestic and wild ungulates. Coppice cutting to stimulate a greater response of suckering is proposed in approximately 13 previously treated and declining aspen stands (approximately 50 acres).

Mountain Mahogany

Of approximately 491 acres treated in this unique habitat type, 311 acres are proposed for commercial thinning and 180 acres for noncommercial treatment. Removal of grand and Douglas-fir 21 inches or larger diameter at breast height would also occur.

These areas historically consisted of open woodland conditions. Encroaching juniper and other conifers would be removed by commercial and noncommercial thinning to release and regenerate mahogany (see draft Austin silviculture prescription). Treatments would be similar to those described in the Dry Forest Ponderosa Pine Forest Type section above, except that commercial units would have a target residual basal area ranging from 25 to 40 square feet per acre.

Openings would also be centered around patches of mountain mahogany and other browse species to promote health and spread of browse habitat. These openings would be up to 2 acres in size and would be kept to less than 10 percent of each treatment unit. When mountain mahogany is located in other stands proposed for treatment, removal of conifers would occur up to 30 feet from existing mahogany patches to promote growth of mahogany. In some instances where

[6] Commercial thinning in aspen would occur only in outer riparian habitat conservation areas.

[7] More than one log lying on another in a fashion that creates a physical barrier of any height on two or three sides of a triangle around an aspen sprout or stem. The treatment helps prevent ungulate travel and excessive herbivory.

multiple trees and seedlings are located, larger openings up to 1 acre may occur. Noncommercial thinning would leave approximately 20 to 40 trees per acre.

Watershed and Fisheries Restoration

Watershed and fisheries restoration activities total approximately 3,499 acres. Of these activities proposed, there are 943 acres proposed for commercial thinning, and 2,556 acres for noncommercial treatment. Restoration activities would include the activities described below (see Austin Appendix B – Maps, Maps 15 and 16).

Commercial and noncommercial treatments would be implemented within the riparian habitat conservation areas of streams and meadows moving them towards desired conditions by reducing stand density, reducing fire hazards, and improving forest health. The level and type of treatment within the riparian habitat conservation area is defined by which zone of the riparian habitat conservation area is being treated (see Table 2). Outer portions of riparian habitat conservation areas are generally more ecologically similar to upland stands than to the inner portions of the riparian habitat conservation area, therefore they would be treated in a similar manner as upland treatment units.

In general, treatments would include variable density thinning, openings, and leave areas, with specifics defined by area of the riparian habitat conservation area. Thinning would be utilized to reduce conifer density (thereby reducing canopy cover) and would increase available soil moisture for riparian hardwood survival and regeneration, and forage for wildlife in stands that are closely related to adjacent uplands.

Removal of trees in outer riparian habitat conservation area would move stands towards desired vegetation characteristics. This is in line with guidance provided in PACFISH TM1- b: “Apply silvicultural practices for [riparian habitat conservation areas] to acquire desired vegetation characteristics where needed to attain [riparian management objectives]. Apply silvicultural practices in a manner that does not retard attainment of [riparian management objectives] and that avoids adverse effects on listed anadromous fish.”

Table 2. Inner and outer zones of riparian habitat conservation areas defined by stream type.

Stream Category	Riparian Habitat Conservation Area	Inner Zone	Outer Zone
Category 1 stream (fish present)	300 feet from channel	Within 100 feet of channel	Between 100 and 300 feet from channel
Category 2 stream (perennial without fish)	150 feet from channel	Within 100 feet of channel	Between 100 and 150 feet from channel
Category 4 stream (intermittent, no fish)	100 feet from channel	Within 50 feet of channel	Between 50 and 100 feet from channel

Stream and Floodplain Restoration

Of approximately 3,145 acres proposed for stream and floodplain restoration, 653 acres are proposed for commercial thinning and 2,492 acres for noncommercial treatment.

Stream and floodplain restoration treatments are proposed to meet PACFISH riparian management objectives. Treatments would include thinning and wood placement in the inner riparian zone of streams. A commercial byproduct may be generated from outer riparian habitat

conservation area treatments. Site-specific level and type of treatment would be based on topography, potential vegetation group, fuel loading, and existing road access (see Austin Appendix A – Activity Tables for detailed information).

In units where both (1) commercial byproduct removal is occurring in outer riparian habitat conservation areas and (2) noncommercial thinning and wood placement is occurring in inner riparian habitat conservation areas; implementation activities would be combined where possible to minimize entries with equipment.

Noncommercial Thinning and Wood Placement

There are approximately 2,492 acres proposed for noncommercial thinning and wood placement.

Stream and floodplain restoration treatments are proposed within riparian habitat conservation areas to meet PACFISH riparian management objectives for shade and large woody debris. This would be accomplished by reducing conifer canopy cover (outside of the primary shade[8] zone) and conifer density in selected areas, increasing available soil moisture and sunlight for riparian hardwood survival and regeneration.

Treatments would include noncommercial thinning, created openings, and leave areas. Prescriptions are designed to reduce density, shift species composition, increase prevalence of shrubs, and meet riparian management objectives for large wood. Treatments are designed to meet Malheur Forest Plan management area 3B standard 29, limiting cumulative total acres of created openings to 10 percent of total riparian acres along any given stream (USDA Forest Service 1990a, page IV-66).

Leave areas range from 5 to 65 percent of stream and floodplain treatment acres, with percentages defined depending on potential vegetation group. See draft Austin silviculture prescription for more information. The remaining portion would include variable density thinning from below to protect old trees and leave early seral trees where possible. Treatments would not remove, fell, or tip old trees as defined by Van Pelt (2008) guidelines and Johnston and Lindsay (2022).

The proposed action would add large woody debris along deficient stream reaches, moving these toward riparian management objectives for large wood. Encroaching conifers up to 21 inches diameter at breast height would be marked for felling, tipping, and placement into streams by heavy equipment. Tipped or felled trees may be placed on the floodplain to dissipate overbank flow.

In noncommercial units, trees in excess of riparian management objectives and recommended fuel loadings may be removed for restoration activities within other riparian habitat conservation areas or piled and burned. The proposed action would use woody debris generated by treatments whenever possible to augment restoration and reduce floodplain fuel loading. If unable to use this material immediately, it would be staged outside of riparian habitat conservation areas for later restoration; piled; or lopped and scattered. Project design criteria would minimize hydrologic or aquatic resource impacts; see Austin Appendix C – Project Design Criteria.

[8] The primary shade zone is based on adjacent hill slope. For hill slopes less than 30 percent, the primary shade zone width is 50 feet. Between 30 and 60 percent hill slope, it is 55 feet. And over 60 percent hill slope, it is 60 feet (USDA Forest Service 2014a).

Commercial Byproduct Removal

Up to approximately 308 acres of commercial byproduct removal are proposed and would include removal of grand and Douglas-fir trees 21 inches or larger diameter at breast height. Commercial removal would only be completed in the outer zone of riparian habitat conservation areas (see Table 2 for definition of inner and outer zones) and when material exceeds that needed for restoration activities. Trees of other species 21 inches or larger diameter at breast height may be felled or tipped for restoration needs or to meet large woody debris riparian management objectives (PACFISH Standard TM-1b and Amendment 29 Standard 3B).

Riparian Meadow Treatment

Of 443 acres treated in this habitat type, 339 acres are proposed for commercial thinning, and 104 acres for noncommercial treatment.

Treatments include any combination of tipping, felling, and removing conifers to reduce conifer encroachment within meadows. Tipped and felled trees would be placed into or directly adjacent to meadow stream channels to increase hydric plant communities and promote water storage. Removed trees would be used in off-site riparian restoration activities or sold as commercial product. Noncommercial thinning would occur within riparian habitat conservation areas for conifers up to 11 inches diameter at breast height. Removal of young (less than 150 years old), relatively large (21 inches or larger diameter at breast height) grand and Douglas-fir would occur.

Harvest Systems

There are approximately 40,000 acres proposed for commercial treatment via the most appropriate and applicable harvest system to meet desired objectives (see Austin Appendix A – Activity Tables).

To facilitate commercial removal, operators would use various types of equipment depending on terrain and access constraints. Whole or cut trees would be transported to landings via tractor skidding, tethered, or skyline systems depending on topography or road access. Ground based systems would be used on slopes up to 35 percent. Where slopes are generally greater than 45 percent and skyline is not feasible, ground-based tethered systems could be utilized.

Tractor yarding or forwarding of logs would generally be used on gentle to steep slopes. A combination of tethered, skyline, tractor yarding, or forwarding would be used where terrain varies. See Austin Appendix B – Maps, Maps 13 and 14 and Appendix C – Project Design Criteria.

Contractors and sale administrators would determine skid trail, skyline corridor, and landing locations before logging. At landings of up to 1 to 2 acres, the vegetation would be cleared for equipment to prepare, deck, and load trees for hauling. In riparian habitat conservation areas, previously used landings may be reused when available for any units where skidding through riparian habitat conservation areas would be needed.

Commercial units could be whole-tree-yarded or cut-to-length, and either grapple or hand-piled and pile burned where needed to meet Malheur Forest Plan standards. To move toward performance-based contracting, the contractor, with Forest Service oversight, would be allowed to determine the most appropriate logging method and activity fuels treatment to meet contract specifications (for example, project design criteria such as tons per acre of fuel left).

Category 4 Stream Crossing

We propose to skid logs from upland units across intermittent streams in 7 locations to reduce the need for temporary roads. Considerations for site-specific skidding locations across intermittent streams include proximity to category 1 streams, channel type, channel and riparian function, floodplain function, soil type, and timing of operations See Austin Appendix B – Maps, Maps 13 and 14.

Prescribed Burning

Prescribed fire would occur on approximately 76,700 acres in 14 separate burn blocks ranging from 1,300 to 14,100 acres per block to reduce fuel loading of ground fuels, surface fuels, ladder fuels, and crown bulk density. Six burn blocks have fall-only timing restrictions to reduce smoke concerns from the Austin and Bates community. We are including approximately 26 acres on the Wallowa Whitman National Forest to incorporate roads, ridgetops, and natural containment barriers.

The proposed action would apply prescribed fire to treated and untreated stands. Treated stands would see a combination of burning piled material and underburning, while untreated stands would be managed primarily with underburning. There would be no active ignition with management area 13 old growth network. See Austin Appendix C – Project Design Criteria.

The acreage of burn blocks does not represent how much of the landscape would be burned. Fuel moisture, shading, and lack of continuous fuel beds contribute to mosaic burn patterns often created during prescribed burning. Depending on weather conditions, fuel characteristics, and project design criteria, the number of "blackened" acres burned would vary within burn blocks.

Management of Unplanned Ignitions

The proposed action would authorize management of unplanned ignitions where conditions and stand characteristics would meet desired outcomes within the planning area. Unplanned ignitions include random fire starts from natural causes (such as lightning). The proposed action would manage natural fires if certain prescription parameters are met such as weather at the time, fuel characteristics, long-term weather forecasts, season of year, and availability of resources to manage a fire. This would take place within approximately 72,590 acres of the planning area.

Wildland Urban Interface Hazardous Fuels Treatments

We are proposing approximately 2,718 acres hazardous fuels treatments to reduce fuel loading in wildland urban interface along the boundary of public and private lands and adjacent to U.S. Highway 26 and Oregon Highway 7.

The proposed action would treat 300 feet around private land boundaries within wildland urban interface and would include strategic road fuel breaks of 300 feet on either side of main ingress and egress routes for public and fire fighter safety and to facilitate use of these roads for fire suppression. See Austin Appendix B – Maps, Maps 9 and 10. Treatments would include variable density thinning of small conifer trees (up to 9 inches diameter at breast height) to 110 trees left per acre which would reduce crown fire initiation.

Activity and natural fuels would have surface fuel heights in forested areas averaging 18 inches or less, and less than 12 tons per acre after prescribed burning. Activity and natural fuels exceeding resource needs and not removed as commercial byproduct may be treated using one or

a combination of the following: piling; lopping and scattering; chipping; pruning; burning of piled material; and underburning. See Austin Appendix A – Activity Tables.

Road Activities

The following road activities would occur in support of vegetation treatments.

Haul, Maintenance, and Reconstruction

We are proposing 574 miles of haul, maintenance, and reconstruction.

The National Forest System roads would be used for vegetation management activities proposed in the planning area. Road maintenance would be performed to access treatment units and haul timber products off National Forest System lands. Road maintenance associated with vegetation treatments would address safety and ecological concerns by creating a safe travelway for vehicles and restoring road infrastructure to allow water to drain off the road properly.

Road maintenance to access treatment units would include brushing roadside vegetation, felling hazard trees, blading roadbeds, cleaning ditches and culvert inlets and outlets, removing slough and slide material, dust abatement, and placing aggregate surfacing. These standard maintenance activities would occur on all roads where commercial activity is planned.

In addition to road maintenance, replacement or reconstruction of culverts, repair of road failures, and junction alignments would occur in isolated places on the road system to facilitate safe haul and mitigate resource damage.

There are three privately owned roads (2.4 miles) that would be required to access commercial treatment units.

Temporary Road Construction

We are proposing 43 miles of temporary road construction. The proposed action would construct temporary roads to access some commercial harvest units. Temporary roads would be rehabilitated after use to restore hydrological function.

Rock Pit Use and Development

We are proposing the use of 15 existing rock pits.

The proposed action would excavate materials suitable for road surfacing, riprap, and other road improvements from existing rock source pits. Additional rock material may be needed; therefore, the proposed action would also expand and excavate Dixie Summit, Wigwam Spring, and Phipps Meadow rock pit sites. Expansion activities include clearing existing vegetation to establish a perimeter, excavating rock from the quarry, stockpiling crushed aggregate, and periodically removing material as need arises.

Road System Changes

Crawford Creek Road and Trail Relocation

Portions of Crawford Creek (National Forest System road 2620000) road occur in valley bottoms and along streams that make up the headwaters of Middle Fork John Day River. These tributary streams are part of an ecosystem supporting endangered species, and plant and animal biodiversity. Relocating portions of this road would minimize sedimentation and reduce

disruption of stream processes, improve aquatic and riparian habitat, and provide continued access for recreation and land management activities.

Road relocation would consist of decommissioning valley bottom roads and establishing new routes for continued motorized access. New routes would be created through a combination of new road construction, existing road improvement, and opening of stored roads to create a continuous route into the area. Additional activities associated with road relocations include placing aggregate surfacing, improving culverts and drainage, and widening curves and junctions on existing roads. New roads would be constructed to facilitate fish passage and avoid or minimize road-stream interactions. Project design criteria associated with road relocations can be found in Austin Appendix C – Project Design Criteria.

We are proposing approximately 1 mile of decommission, less than a half mile of new construction, and 1 mile of re-opening for a total of 2 miles of road relocations in Crawford Creek.

Crawford Creek Road (National Forest System road 2620000) is proposed for relocation to alleviate impacts to floodplain process, fish passage, and fish habitat. The relocated route is proposed to minimize stream crossings, increase stream-floodplain connectivity, and improve access to public lands during wet seasons. Where possible, roads were relocated to areas where the valley widens or where decommissioned roadbeds currently exist. Snowmobile trail S-5402 would be realigned to relocated sections of Crawford Creek Road. See Austin Appendix A – Activity Tables and Appendix B – Maps, Map 17 for descriptions of road activities and road system changes.

Proposed Malheur Forest Plan Amendments

The Malheur Forest Plan provides a long-range strategy for managing the Forest. Forest-wide standard 3 states that "If it is determined during project analysis that the best way to meet the management area goals of the Forest Plan conflicts with a Forest Plan standard, the Forest Supervisor may approve a[n]…amendment to that standard for that project…" (USDA Forest Service 1990a, page IV-25). Therefore, changes to the original Malheur Forest Plan were anticipated based on site-specific resource conditions.

The Forest Service has enacted rules (36 Code of Federal Regulations 219) to guide changes to forest plans, including amendments[9]. 36 CFR 219.13(b)(5)(c) requires the responsible official to determine which specific substantive requirements within § 219.8 through § 219.11 are directly related to plan direction being added, modified, or removed by the amendment and to apply those requirements within the scope and scale of the amendment.

Whether a provision is likely to be directly related to an amendment is determined by the purpose for the amendment, the beneficial effects of the amendment, and the adverse effects of the amendment, as informed by best available scientific information, scoping, effects analysis, monitoring data, or other rationale.

The substantive requirements that are likely directly related to the purpose or effects of these potential forest plan amendments are 36 CFR 219.8(a)(1)(i), 219.8(a)(1)(ii), 219.8(a)(1)(iii), 219.8(a)(1)(iv), 219.8(a)(1)(v), 219.8(a)(1)(vi), 219.8(a)(2), 219.8(a)(3), 219.8(a)(4), 219.9(a)(1),

[9] National Forest System Land Management Planning, Final Rule, 77 Red. Reg. 21,162 (April 9, 2012): amended by Final Rule, 81 Fed. Reg. 90,723 (Dec. 15, 2016) (codified at 36 CFR Part 219).

219.9(a)(2), 219.9(a)(2)(i), 219.9(a)(2)(ii), 219.9(a)(2)(iii), 219.10(a)(1), 219.10(a)(3), 219.10(a)(5), 219.10(a)(7), 219.10(a)(8), and 219.10(a)(10).

More details regarding substantive provisions determined likely or unlikely to relate to the proposed amendments are available in the project record. Also see Evaluation of Proposed Forest Plan Amendments.

To address the purpose and need, the proposed action would require project specific amendments to the Malheur Forest Plan as amended. These include amending:

- Malheur Forest Plan, Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover in the Wiwaanaytt[10] Creek subwatershed below Malheur Forest Plan standards for the Middle Fork John Day River of 12 percent.
- Malheur Forest Plan, Forest-wide standards 33 and 35 (USDA Forest Service 1990a, page IV-29) to maintain existing open road density. The Malheur Forest Plan directs us to limit disturbance to big game by reducing open road density below 3.2 miles per miles squared or move toward this goal in the shortest time frame possible. The Malheur Forest Plan also directs us to use road closures to achieve specific wildlife habitat management objectives of individual management areas.
- Malheur Forest Plan, management area 13, standards 4 through 8, which include to inventory and validate all old growth areas and correct previous designations. The Malheur Forest Plan directs review of dedicated and replacement old growth during project planning to ensure consistency with old growth standards and guidelines.
- Malheur Forest Plan, management area 14 standard 11 (USDA Forest Service 1990a, page IV-108) to allow for a short-term deviation from the visual quality objective standard of retention in the U.S. Highway 26 and Oregon Highway 7 visual corridor foreground.
- Malheur Forest Plan, management area 14 standard 19 (USDA Forest Service 1990a, page IV-108) to allow for seedtree harvest (regeneration harvesting) in the middleground of U.S. Highway 26 viewshed that would result in created openings greater than 10 acres.
- Eastside Screens, standard 6(d)(2)(a) to allow removal of young (less than 150 years old), relatively large (21 inches or larger diameter at breast height) grand fir and Douglas-fir trees (USDA Forest Service 1995a).
- Eastside Screens, standard 6(d), scenario A to allow commercial restoration treatments within both old forest single-stratum[11] and old forest multi-strata[12] stands. This amendment would be required for the cold, dry, and moist upland forest potential

[10] This stream was officially renamed Wiwaanaytt Creek. However, for the purpose of clarity and transparency, tis stream was formerly known as "Squaw Creek." The subwatershed has yet to be formally renamed so in lieu of "Squaw Creek Subwatershed," we will be referring to "Wiwaanaytt Creek Subwatershed" as the subwatershed that houses Wiwaanaytt Creek.

[11] Old forest single-stratum refers to the structural class at which a single-stratum of medium to large, old trees of one or more cohorts are present. Structure is maintained through nonlethal fire or management. (O'Hara et al. 1996)

[12] Old forest multi-strata refers to the structural class at which two or more cohorts and strata are present, including large, old trees (O'Hara et al. 1996).

vegetation groups because each of these groups has one late and old structure stage that is below and one that is within or above historical range of variability.

- Eastside Screens, standard 6(d)(3)(a), which provides direction to maintain or enhance the current level of connectivity between late and old structure and management area 13 stands. Under the proposed action, connectivity corridors would be designated between all management area 13 stands and to adjacent watersheds; however, not all late and old structure stands would be connected two ways.

Reduce Satisfactory Cover below Malheur Forest Plan Standards in Big Game Summer Range

An amendment is proposed to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover in Wiwaanaytt Creek subwatershed below Malheur Forest Plan standard for the Middle Fork John Day River watershed. The proposed action would temporarily reduce satisfactory cover from the existing 46.8 to 7.2 percent (a 39.6 percent reduction, 4.8 percent below the standard of 12 percent). The cover amendment would apply only for the duration of, and for those actions proposed in, the site-specific Austin Project. For details on methods and analysis of cover and elk, see the Wildlife Report.

Maintain Current Open Road Density

Forest wide standard 33 is to limit disturbances to big game by meeting open road density of 3.2 open road miles per square mile, and when existing conditions do not meet this goal, to move towards this goal in shortest timeframe possible. Forest-wide standard 35 is to use road closures to achieve specific wildlife habitat management objectives of individual management areas (USDA Forest Service 1990 page IV-29).

The Bridge Creek, Dry Fork Creek, and Wiwaanaytt Creek subwatersheds within the planning area currently do not meet the 3.2 open road miles per square mile road density standards.

Aligning with the administration's priorities, travel management regulations and policy are under review at the agency and departmental levels. To ensure Pacific Northwest regional projects do not result in decisions that may be inconsistent with potential future change, the regional forester issued a letter on June 25, 2025, Interim Guidance for Travel Management Proposals and Decisions, directing us to suspend incorporation of travel management proposals that would decrease motorized public access, and defer travel management decision-making. Therefore, we removed all proposals from Austin Project that would open, store, decommission, or confirm past administrative road decisions as described in the scoping package, except for the road relocation associated with Crawford Creek Road.

Because Austin Project would maintain the current open road density of Bridge Creek, Dry Fork Creek, and Wiwaanaytt Creek subwatersheds to meet the administration's direction, and therefore would not meet the Malheur Forest Plan standard for open road density or using road storage to achieve wildlife habitat objectives, we would need a forest plan amendment for Forest-wide standards 33 and 35.

Management Area 13 Dedicated Old Growth Changes

An amendment is proposed to Forest standards 4 through 8 that direct the Forest to inventory and validate all management area 13 old growth areas and correct previous designations. Proposed changes align with standards 4 through 8, (USDA Forest Service 1990a, pages IV-105 to IV-

106). The proposed action would result in approximately 7,163 acres proposed for management area 13, a slight reduction in total acres from the no action alternative; however, these changes would meet Malheur Forest Plan requirements for old growth size, distribution, and acres.

Proposed changes would include the following improvements to better meet Malheur Forest Plan standards: some stand boundaries would be changed to areas with more suitable old growth conditions that include a greater component of larger or older trees and more structural and vertical complexity; changes to boundaries to create a single continuous stand rather than smaller separated patches; relocation of some stands to more suitable areas with better old growth characteristics; and creating a replacement old growth area for those dedicated old growth units without one. See the management area 13 section of the Wildlife Report for further details.

Proposed changes would result in 16 dedicated old growth units, made up of 7 dedicated old growth units for Pacific marten, 1 for pileated woodpecker, and 8 for both species. The proposed action would convert one Pacific marten and pileated woodpecker old growth stand (04369 PP) to a Pacific marten-dedicated old growth stand (04369 MM) which would reduce the size slightly. This change would still meet Malheur Forest Plan direction for amount of old growth based on size of the planning area and total old growth and would allow for treatment along the highway to reduce shading and improve winter driving conditions (see Winter Shading Treatments section). This distribution meets Malheur Forest Plan requirements for number of Pacific marten- and pileated woodpecker-dedicated old growth areas per a given area based on total acres of National Forest System lands within Austin planning area (approximately 75,900 acres). No changes to replacement old growth would occur except the name change and designation for Pacific marten.

See Austin Appendix B – Maps, Map 18 for proposed dedicated and replacement old growth locations.

Short-term Deviation from Visual Quality Objective Standard of Retention

An amendment is proposed to Malheur Forest Plan management area 14, standard 11 for short-term deviations from retention visual quality objectives in the U.S. Highway 26 and Oregon Highway 7 viewsheds. The proposed action would create visual impacts that could take longer than 5 years to meet retention standards on about 868 acres.

Seedtree Harvest in U.S. Highway 26 Viewshed Middleground

The proposed action would require an amendment to Malheur Forest Plan management area 14, standard 19 for managing middleground partial retention areas (USDA Forest Service 1990a, page IV-111).

This amendment is being proposed to allow for seedtree harvest (regeneration harvesting) in the middleground of U.S. Highway 26 viewshed. Proposed treatments on about 116 acres in three units (two 40-acre units and one 36-acre unit), within partial retention visual quality objective would result in created openings greater than 10 acres.

Remove Trees 21 Inches or Larger Diameter at Breast Height

The proposed action would amend the Eastside Screens, standard 6(d)(2)(a) to allow removal of young (less than 150 years old), relatively large (21 inches or larger diameter at breast height) grand and Douglas-fir trees across the planning area in the commercial thinning (approximately

29,340 acres), stream and floodplain restoration (approximately 3,047 acres), and seedtree regeneration (668 acres) units.

Trees greater than 150 years old would be determined by applying the guidelines presented in Van Pelt (2008) for Douglas-fir and Johnston et al. (2018) for grand fir. This amendment would apply only for the duration of, and for those actions proposed in, the site-specific Austin Project.

Harvest within Late and Old Structure Stands

An amendment is proposed to Eastside Screens, standard 6(d), scenario A to allow commercial removal in approximately 3,370 acres of upland restoration commercial thinning, 850 acres of upland restoration biomass removal, 60 acres of stream and floodplain restoration, and 30 acres of riparian meadow restoration within old forest multi-strata stands. It would also allow commercial removal in approximately 630 acres of upland restoration commercial thinning, 10 acres of upland restoration biomass removal, 10 acres of stream and floodplain restoration, and 10 acres of riparian meadow restoration within old forest single-stratum stands.

This amendment would be required for the cold, dry, and moist upland forest potential vegetation groups because each of these groups has one late and old structure stage that is below and one that is within or above historical range of variability.

Commercial removal would follow descriptions above for each proposed restoration activity. Upland restoration commercial thinning, stream and floodplain restoration, and riparian meadow restoration includes removal of select trees less than 21 inches diameter at breast height for all species, as well as removal of young (less than 150 years old) grand and Douglas-fir trees 21 inches or larger diameter at breast height. Biomass removal generally includes removal of select trees less than 21 inches diameter at breast height. There would be no net loss of late and old structure stands long-term.

Not Maintain Connectivity between All Late and Old Structure and Old Growth Stands

An amendment is proposed to Eastside Screens, standard 6(d)(3)(a) to not maintain or enhance the current level of connectivity between all late and old structure and old growth (management area 13) stands. Wildlife connectivity corridors would be designated between all management area 13 stands, some late and old structure stands, and to wildlife connectivity corridors in adjacent watersheds. However, to better meet the purpose and need to maintain and improve diverse forest composition and stocking levels to promote landscape resiliency, the proposed action proposes not to connect 35 percent of late and old structure stands.

Approximately 9,220 acres of wildlife connectivity corridors would be designated to connect management area 13 and late and old structure stands within and adjacent to Austin planning area, with approximately 65 percent of late and old structure stands connected two ways.

Modifications to the Proposed Action since Scoping

Modifications to the proposed action that were scoped to the public are:

- Modified prescription for mixed conifer restoration commercial units to thin to a leave-tree description instead of target basal area.
- Increased basal area range for dry forest ponderosa pine.

- Modified upland restoration units directly adjacent to previous regeneration stands to seedtree regeneration harvest.
- Modified upland restoration activities to include potential tree tipping from commercial units for aquatic restoration.
- Included commercial treatment of outer riparian habitat conservation areas designated to skid through to road.
- Included removal of grand and Douglas-fir trees 21 inches or larger diameter at breast height in outer riparian habitat conservation areas during stream and floodplain treatments.
- Included removal of grand and Douglas-fir trees 21 inches or larger diameter at breast height during riparian meadow restoration treatments.
- Incorporated cable assisted (tethered) equipment on slopes greater than 45 percent where skyline yarding is not feasible.
- Incorporated upland restoration and hazardous fuels treatments along U.S. Highway 26 to reduce winter shading and black ice formation along the highway for public safety.
- Reduced hazardous fuel breaks from 660 feet to 300 feet.
- Modified hazardous fuels treatments to include strategic roads.
- Modified hazardous fuel treatment objectives from 20-foot non-variable spacing to variable spacing of 18 to 25 feet for trees less than 9 inches diameter at breast height to achieve desired vegetation species composition and meet visual quality objectives.
- Modified timing of 6 prescribed burning burn blocks.
- Reduced acres of connectivity corridor designation.
- Dropped Crawford growing stock research plot treatments.
- Dropped Dry Fork road relocation and alternate access proposal.
- Dropped all road storage, decommissioning, re-opening, new construction, and all road relocations except for Crawford Creek as described below.
    - Crawford Creek road relocation and alternate access:
        - Added 0.9 miles of previously decommissioned National Forest System road 2620177 and National Forest System road 2620142 to be re-opened to facilitate alternate access of National Forest System road 2620000 (Crawford Creek Road).
        - Added 0.5 miles of decommissioning National Forest System road 2620000.
        - Dropped 0.4 miles of decommissioning and new road construction along National Forest System road 2620000.
        - Dropped less than 0.1 miles of decommissioning of National Forest System road 2620174.

- Dropped Bridge Creek and Sumpter Valley Railroad Trail and trailhead construction.
- Dropped road to trail conversions for National Forest System roads 2600274 and 2614155 associated with Bridge Creek Trail.
- Added Phipps Meadow rock pit expansion.
- Added 2 forest plan amendments to allow short term deviation from visual quality objectives and seed tree regeneration openings larger than 10 acres in visual corridor middleground.
- Added 1 forest plan amendment for maintaining current open road density.

Design Features

The Forest Service developed project design criteria for the project (see Austin Appendix C – Project Design Criteria) to minimize and reduce impacts associated with proposed activities.

Monitoring

Monitoring of seedtree regeneration units in the proposed action would be required under the National Forest Management Act. Monitoring would include stocking surveys in the first and third years after final treatment to determine if minimum stocking requirements are being met through residual trees and natural regeneration. If minimum stocking requirements are not met, units would be planted with genetically adapted seedlings at a rate that would meet minimum stocking guidelines.

Tethered logging is a new type of logging system for steeper slopes on the Forest. Several other forests in the Pacific and Inland Northwest have completed tethered logging and studies of its effects thus far have not indicated excessive displacement and erosion. However, soils on steep slopes tend to be highly displaceable and erodible. The Austin environment has different biophysical characteristics than other forests and there is a possibility that harvest operations would use different equipment than what was used at other locations.

Monitoring the effects of tethered logging is crucial to understanding the effects this evolving logging system has on soils found on the Malheur National Forest. The purpose of monitoring is to capture the overall extent of detrimental soil conditions (such as compaction, displacement, puddling, and erosion) from tethered logging on steep slopes.

Pre-harvest monitoring would occur to accurately describe soil conditions before tethered logging. Post-harvest monitoring would occur at least a year after harvest operations have been completed. Targeted soils monitoring would be prioritized on commercial portions of winter shading units to assess the effects of tethered logging in riparian habitat conservation areas. In addition, soils monitoring would occur on a range of soil types found within tethered units to better understand how different soil characteristics respond to this new logging system.

Other Aquatic Restoration Treatment Information

Additional aquatic restoration activities authorized under the 2014 Aquatic Restoration Decision would occur throughout the planning area (USDA Forest Service 2014b). See Austin Appendix D – Past, Ongoing, or Reasonably Foreseeable Activities, Table D-2 for more information.

Alternatives Considered but Not Analyzed in Detail

Public comments received in response to the proposed action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of purpose and need for action, did not align with current agency priorities, or were determined to be components that would cause unnecessary environmental harm. Therefore, several alternatives were considered but dismissed for reasons summarized below.

Modified Scoping Proposal

An alternative was considered that modified the scoping proposed action by adding multiple road actions to respond to both motorized access needs and resource concerns. This alternative was eliminated as it no longer aligns with agency direction and priorities. See Maintaining Current Open Road Density for more information.

Environmental Alternative

An alternative was considered that modified the scoping proposed action by adding multiple roads activities that would have reduced motorized access by storing roads, decommissioning roads, and confirming past administrative storage which would have created or expanded elk security[13]. This alternative would also have reduced commercial treatment as much as possible, prohibiting harvest of large (greater than 21 inches diameter at breast height) or old trees, harvest within riparian habitat conservation areas, and treatments in late and old structure and old growth. It would have limited hazardous fuels treatments and prohibited prescribed burning in riparian habitat conservation areas and old growth. This alternative was eliminated as it no longer aligns with agency direction and priorities.

Do Not Use Prescribed Fire in Crawford Project Area

An alternative was considered that would not use prescribed fire in previously burned areas within Crawford Project area. This alternative was eliminated from detailed study because by the time Austin Project is signed and being implemented, these areas will be due for maintenance burning (occurs approximately every 5 to 15 years). Maintenance burning of these areas is needed to maintain reduced fuel loadings achieved by Crawford Project, rather than allowing fuels to rebuild to a level that risks catastrophic wildfire which would not meet the purpose and need to lower fire behavior intensity.

Do Not Build Temporary Roads

An alternative was considered that would not construct temporary roads. This alternative was eliminated from detailed study because temporary roads provide access to treatment areas to improve forest composition and stocking levels. Providing access for removal of merchantable material is necessary to meet project objectives. Leaving these stands untreated due to lack of access would not shift species composition and structural stages within or move toward historical range of variability; or reduce density and fuel loading to effectively improve fire risk and safety conditions.

[13] Hillis et al. (1991) defines elk security as a block of habitat at least 250 non-linear acres at least half a mile from an open road.

Do Not Target Fir for Commercial Treatments Based on Species Composition or Historical Range of Variability

This would conflict with the purpose and need of maintaining and improving diverse forest composition and stocking levels. An alternative was considered that would not target fir tree species in commercial treatments. This alternative was eliminated from detailed study because grand fir and Douglas-fir tree species would outcompete ponderosa pine, western larch, and western white pine species due to their disproportionate shade and seed production.

Avoid Treatments in and around the Humongous Fungus

This is addressed in the no action alternative. An alternative was considered that would avoid treatments in and around the humongous fungus. This alternative was eliminated from detailed study because it would not meet the purpose and need of the project. As a natural part of the landscape, we do not intend to manage this species, including avoiding other management activities where it grows. The humongous fungus has likely expanded to its current size, approximately 2,385 acres (Schmitt and Tatum 2008), over several millennia, despite changes in forest management over approximately the last 150 years. It is unlikely that forest management (such as thinning or controlled burning) would have a significant effect on it (Ferguson et al. 2003).

Only Noncommercially Thin and Prescribed Burn

An alternative was considered that would drop all commercial treatments and would only noncommercially thin stands. It would also drop prescribed burning within cold and moist upland forest potential vegetation groups. This alternative was eliminated from detailed study because it would not meet the purpose and need of the project to restore forest structure, composition, and density toward more resistant and resilient vegetative conditions given the historical fire regime. It would also not provide for a variety of forest products and forest management employment opportunities to help maintain community stability and infrastructure.

Site productivity in Austin planning area is high for the Forest due to higher precipitation rates and relatively deep ash soils. Due to this productivity, fire suppression, past grazing practices, and past harvesting practices, the planning area has changed dramatically over the past century.

In the dry upland forest potential vegetation group, there are relatively young, medium diameter ponderosa pine forests where pine savannahs with scattered large, old ponderosa pine once existed. In the cold, dry, and moist upland forest potential vegetation groups within mixed conifer forest, there are young, dense, and highly homogenized forests of predominantly grand fir and lodgepole pine where highly variable, mixed species stands of predominantly western larch and ponderosa pine used to exist. Ingrowth of grand fir, lodgepole pine, Douglas-fir, and even ponderosa pine due to fire suppression is large and can be more than 30 inches diameter at breast height.

Limiting treatments to noncommercial thinning and burning only in the dry upland forest potential vegetation group would capture very little of that ingrowth. It would also not reduce density or shift species composition enough to affect forest structure or fire hazard based on professional judgment and modeling.

Larger, relatively young trees would need to be removed to shift forest structure and species composition, as well as reduce forest density given historical fire regimes. Relatively large,

young grand fir and Douglas-fir would also need to be removed to reduce ladder fuels and density to help alleviate stress on large, old ponderosa pine and western larch trees that are desirable to maintain on the landscape.

Drop all Commercial Logging within Moist Potential Vegetation Group Forest Types

An alternative was considered that would not propose activities within moist upland forest potential vegetation group forest types. This alternative was eliminated from detailed study because without treatment, the landscape in these areas would continue to move away from the natural (historical) fire regime, putting the area at risk of uncharacteristic wildfire and potential loss of habitat. Without fuels treatments to remove surface and ladder fuels, potential intensity of surface and crown fires would increase.

Designation of forest types may not reflect the manner in which a stand historically functioned. Small pockets of moist upland forest intermixed within a larger landscape of predominantly dry upland forest would have experienced similar disturbance regimes and conditions as the dominant forest type surrounding them. Johnston et al. (2016) compared pre-settlement fire frequency in ponderosa pine and mixed conifer forests of the southern Blue Mountains of eastern Oregon on 10 randomly selected sites on the Forest.

The 10 sites were all selected within inventoried roadless areas in order "to avoid the effects of past timber harvest on historical reconstructions." Sites ranged from ponderosa pine xeric potential vegetation type to moist grand fir potential vegetation type. The researchers concluded that all sites experienced frequent fires and "management that emulates the effects of frequent fire is appropriate in a wide range of forest types in the southern Blue Mountains, although basing compositional targets on late 19th century forest structure may not be appropriate given changing climate."

ENVIRONMENTAL REVIEW

The following documents compliance with the National Environmental Policy Act (NEPA) and other relevant environmental laws, executive orders, and regulations.

National Environmental Policy Act

This section discloses environmental impacts of the proposed action, and the scientific and analytical basis for the comparison of effects. Resource reports including full analyses are incorporated by reference and are available in the Austin Project record. Additional information on Austin Project is available in the Supporting Documents on the Forest's website at: https://www.fs.usda.gov/r06/malheur/projects/53678.

Issues Considered for Analysis

The issues presented in this section are those that are amendable to scientific analysis, have a cause-and-effect relationship with the action, and would aid the decision-making process. Issues that have no possibility of significantly affecting resources or are not amendable to scientific analysis are not included. Issues serve to highlight effects or unintended consequences that may

occur from the proposed action or alternatives, giving opportunities during the analysis to reduce adverse effects and comparing trade-offs for the decisionmaker and public to understand.

Significant issues were defined as those directly or indirectly caused by implementing the proposed action, may involve potentially significant effects, and could be meaningfully and reasonably evaluated and addressed within the scope of this proposal.

The proposed action was developed around those significant issues. Resource measures are included below each issue statement as indicators of effects which measure change from existing condition for the proposed action.

The Forest Service identified the following significant issues during scoping that drove alternative development:

Forest Health and Resiliency: Vegetation and fuels treatments may impact forest health and resiliency to insects, diseases, and uncharacteristically severe wildfire.

- Stand Density: Percent change of acres above management zone, within management zone, and below management zone as defined by maximum stand density index.
- Species Composition: Percent change of early seral species across the planning area.
- Structural Stages: Percent change in structural stage in relation to historic range of variability.
- Fire Behavior: Flame length and crown fire activity.

Smoke Emissions: Degree to which smoke emissions from prescribed burning may impact air quality and public health.

- Greenhouse Gas Emissions: Tons of carbon monoxide, carbon dioxide, nitrous oxide, and sulfur dioxide particulate matter released.

Old Forest and Large Tree Structure Habitats and Associated Wildlife Species: Vegetation and fuels treatments may impact old forest and large tree structure habitats and associated wildlife.

- Large Tree Structure: Acres by stand structure type and species where large trees would be commercially removed.
- Late and Old Structure Habitat: Acres and percentage treated of late and old structure.
- Snag Density: The removal of dead and downed wood may impact snag density for wildlife habitat.
    - DecAID Snag analysis: projected trend in short (10 years), mid (25 years), and long-term (25 to 40 years).
- Wildlife Connectivity: Number and proportion of dedicated old growth and late and old structure connected two ways; acres and percentage of connectivity corridors treated.

Economics: Commercial treatments, logging systems, and road relocations may impact employment, costs, and revenues in local economies.

- Project Feasibility and Economic Efficiency: Acreage, volume, present net value of commercial harvest and byproducts, service work (U.S. Dollars, percentage) in local communities.

- Cost: Dollar cost and long-term investments of road relocation.

Visuals: Vegetation and fuels treatments in visual corridors may impact visual quality objectives.

- Visual Corridors: Scenic integrity and scenic stability as affected by acres of visual corridors treated on steep slopes with tethered and skyline logging harvest systems; and acres of seed tree regeneration units in middleground.

Watershed Condition: Road maintenance, log haul, and vegetation and fuels treatments may affect water quality, aquatic habitat, and riparian condition.

- Water Quality: Anticipated change in 7-day average daily maximum stream temperature trend.
- Channel Shape and Function: Effects to 6 primary habitat indicators (pools per mile, mean wetted width-to-depth ratio, percent stability, percentage of streambed composed of fine sediment, 7-day mean maximum temperature and percent shade, and pieces of large wood per mile in forested systems).

Some comments and issues identified during scoping did not warrant further detailed study. These include comments or questions that did not meet criteria for identification as significant issues or analysis issues as described above.

Forest Health and Resiliency

This section analyzes to what degree vegetation management and prescribed fire proposals address emergency conditions, improve forest health, and make the forest and surrounding private lands and inholdings more resilient to insects, disease, and wildfire.

This analysis issue is framed by the following measures: fire behavior, structural stages, stand density, and species composition.

Fire Behavior

Flame length influences suppression strategies and tactics used by firefighters and mechanical equipment. Increased flame length reduces effective fire suppression strategies and increases the likelihood of high fire behavior events such as torching and crown fires. Crown fires are common in coniferous forests and chaparral-type shrublands.

There are two types of crown fires: active and passive. During an active crown fire, the entire fuel strata is involved in flame, and the crowning phase is dependent on energy released from surface fuels for continued spread. During a passive crown fire, only the crowns of individual trees or small groups of trees burn, and conditions such as wind and lack of energy from surface fire spread do not support significant propagation from tree to tree to sustain active crown fire except for short periods.

Flame length and crown fire are appropriate measures for this analysis because they give information about potential fire behavior and effects. Risks to firefighters, workers, and public can be assessed from potential fire behavior. The fuel load not only determines whether a fire would grow but, in combination with fuel type, determines fire intensity and effects.

Methodology

Field inventories were conducted to measure attributes of existing vegetation in the planning area. Treatment units within the planning area were inventoried using on-site photo interpretation. These treatment units are representative of the planning area to be treated in the proposed action.

Data was collected on live and dead trees. The data was used in the following analysis, data tables, graphs, and charts, and is incorporated by reference. Geographic information systems (GIS) LANDFIRE program[14] data and on-site visits were used to determine fuel models. A study conducted in 2005 and associated surface fire spread model were used for fire modeling (Scott and Burgan 2005). Interagency Fuels Treatment Decision Support System (IFTDSS) was used for the analysis of flame length, crown fire potential, and Quantitative Wildfire Risk Assessment (QWRA).

Analysis for fire behavior was calculated using the 97th percentile fire weather factors from Yellow Pine Remote Automated Weather Station between 2010 and 2020 (4,600 feet elevation, June through September) and from Keeney Two Weather Station between 1995 and 2017 (5,120 feet elevation, May through October). Ninety-seventh percentile weather is used to define high-extreme conditions for an area using historical weather data of that area.

Spatial and Temporal Context

The spatial context for direct, indirect, and cumulative effects analysis is forest vegetation, fuels, and fire behavior at stand level within Austin planning area.

Direct and indirect effects would occur as proposed treatments are implemented. The temporal context for indirect and cumulative effects analysis is 40 years. From a fuels perspective, the number of stand structure possibilities would be difficult, if not impossible, to quantify with any type of certainty beyond 40 years. Project implementation would begin following project decision signature and may continue for approximately 20 years; however, vegetation would continue to grow, and maintenance would be needed to maintain desired condition.

Potentially Affected Environment

Austin desired fuels condition is for the planning area to be predominantly characterized as a LANDFIRE fire regime I, condition class 1. This would mean that fires in the area typically burn at a low severity and occur relatively frequently (every 0 to 35 years). These frequent surface fires maintained an open forest structure, reduced surface and ladder fuels, and sustained fire-tolerant species such as ponderosa pine and western larch. However, today, approximately 90 percent of the planning area is in a fire regime I, condition class 3. Condition class 3 means that fire regimes and vegetation are significantly altered from historic conditions. Fire frequencies have departed from historical frequencies by multiple return intervals.

These conditions are expected to produce uncharacteristically large or severe wildfire events, well outside the range of what would have historically occurred. This may result in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns.

Decades of fire exclusion, past management practices, and the resultant change in vegetation composition have resulted in a dense forest structure, elevated surface and ladder fuels, and

[14] See https://www.landfire.gov/.

increased presence of fire-sensitive, shade-tolerant species. Currently, most of the planning area has a high potential for stand-replacing fire and the risk of losing key ecosystem components is high. Large, severe wildfires pose significant risks to public and firefighter safety, including physical injury, health issues from smoke exposure, mental and emotional stress, and potential loss of life or property.

Environmental Impacts

No Action Alternative

Surface fuel loadings would continue to increase over time as shrubs grow and competition-created snags fall. Although competition would naturally thin the stand, shade-tolerant species would continue to grow in the understory. This would keep height-to-live crown low and crown density high. The large fire-resistant trees in the stand would remain if they successfully compete for limited resources. These trees would continue to be competition-stressed and at risk from insects, disease, and wildfire.

There would be no significant change in expected fire behavior on the landscape in the short-term. Stands would continue to be at risk from stand-replacement fire. With continued surface fuel accumulation, it is likely that surface fire intensity and crown fire potential would increase over the long-term.

It is expected over the long-term that, without some form of intervention, wildfire would have unwanted effects within the analysis area and change the historic influence of fire within the area.

This alternative would have the least immediate impact on flame length or crown fire, as there would be no stand treatment, prescribed burning, or pile burning. All biomass would remain available for consumption by wildfires and would continue to accumulate, increasing the potential for large fire. Passive crown fire activity would be anticipated; flame lengths would be 4 to 8 feet in height. During suppression actions, fires may present serious control problems such as torching, crowning, and spotting. Control efforts at the fire head would likely be ineffective.

Proposed Action

Direct and Indirect Effects

Proposed activities would reduce fuel loading across approximately 35,100 acres. Not all treatments would need to be implemented on every acre to achieve desired outcomes.

Vegetation and fuels treatments would increase the height-to-live crown while retaining the largest trees, which reduces crown fire initiation. Treatments would reduce the horizontal and vertical fuel loading. Crown density would also be reduced, lowering active crown fire potential. The surface fuels treatments change the size and arrangement of available fuel and reduce the amount of fuel that is available to burn, reducing flame lengths, crown fire activity, and emissions.

Within prescribed burn blocks, there would be several unburned acres. Examples include open scabby areas, wet riparian areas, and north-facing aspects. Much of the prescribed fire area is expected to burn in a mosaic pattern due to variations such as fuel moisture, shading, grazing, and lack of continuous fuelbeds. Project design criteria limiting where active ignitions can occur within a particular burn block would also limit actual burned area. Depending on weather

conditions, fuel characteristics, and project design criteria, number of acres burned could vary from 50 to 80 percent of proposed burn block size.

Thinning trees from below would raise canopy base heights, reducing crown fire initiation which would increase the likelihood that fires would stay as surface fires and not become crown fires. Surface treatments should lower flame lengths. Fire could be reintroduced into the planning area. Fire behavior and effects would be similar to historical conditions within fire regime I that allowed fire to burn naturally in the planning area.

Post-treatment, fire activity is expected to be surface level; flame lengths would be up to 4 feet in height. These lower flame lengths are a direct result of lower fuel loadings, lower canopy bulk densities, and higher canopy base heights. Fires burning in stands under 90th percentile weather conditions can generally be attacked at the head or flanks by persons using hand tools. Suppression forces could enter these areas and take appropriate actions as needed to manage fires (Brown et al. 2003). Direct attack with hand tools would be sufficient to contain fires when necessary and hand line should hold the fire.

Creating and maintaining fuel-breaks along strategic roads to break up large expanses of continuous fuels would provide for firefighter access and safety, increase suppression opportunities, and provide pre-existing control points to contain fires. The fuelbreaks along strategic roads would allow safe travel for the public and suppression forces should the need arise to escape from an emerging wildland fire.

The effect on fire suppression forces would depend on continued maintenance of stands. Continued maintenance and prescribed fire rotation would be required every 7 to 15 years. Stands that are maintained and managed to achieve desired conditions would not adversely impact future suppression. Prescribed fire, hazardous fuels treatments, and management of unplanned ignitions would reduce fuels across Austin planning area, reducing the risk of catastrophic wildfire and associated safety concerns. Strategic road treatments would also provide safer routes for ingress and egress in the event of an emergency.

Cumulative Effects

Treatments from this project, when combined with grazing and firewood cutting activities, would improve stand survivability during a wildfire event by reducing canopy bulk density, canopy base heights, and fuel loading. Treatments would complement the planning area by reducing fire behavior and fire effects, as well as creating safe travel routes along select roads within the planning area boundary. In the event of a wildfire, the planning area would be conducive to allowing fire to be a natural disturbance and move across the landscape as predominantly surface fire within its historical fire regime.

Structural Stages

Methodology

The planning area is greater than 15,000 acres, the appropriate size to conduct a historical range of variability analysis (Powell 2012). According to Powell (2012), it is not appropriate to conduct a historical range of variability analysis for a potential vegetation group within a planning area if it is less than 1,000 acres because a full complement of cover types, structural stages, or tree density classes would not be expected for such a small acreage. Three upland

forest potential vegetation groups that occur within the planning area exceed 1,000 acres in size, as displayed in Table 3.

Existing conditions were determined by individual field visits by the silviculturist as well as group visits with interdisciplinary team members and collaborators which included local stakeholders. There were stand walkthroughs as well as formal stand exams and data analysis.

Stand exams were conducted in 2016 and 2017. These exams cover 218 stands and 5,880 acres within Austin planning area. The Natural Resource Inventory System (NRIS) vegetation polygon layer was used as the base layer for classifying vegetation. Field verification of plant association and structure occurred in 2017 and 2018.

A formal site visit to Austin planning area by Forest Health Protection, Blue Mountains Forest Insect and Disease Service Center occurred on June 27 and 28, 2016. The objective of this visit was to assess the overall health of trees and the forested environment of Austin planning area. A letter dated May 15, 2017, by Mike Johnson (entomologist) and Michael McWilliams (pathologist) is available in the Austin Project record (USDA Forest Service 2017a). This letter documents their findings, which are incorporated here by reference.

FSVeg Spatial Data Analyzer is an ArcGIS extension that was designed to allow users to model growth and vegetation treatments on forested stands using Forest Vegetation Simulator (FVS) and stand exam data stored within the Forest Service corporate data management system for stand exams (FSVeg). All three resource indicators and measures were analyzed with FSVeg Spatial Data Analyzer.

The FSVeg Spatial Data Analyzer Nearest Neighbor process was used to populate forested stands without stand exam data from stands with existing stand exam data. Nearest Neighbor analysis uses satellite imagery, spatial relationships, and topographic information to match target stands without data to the most similar reference stand with data. Tree data from the reference stand is then assigned to the target stand (imputation).

Statistics were generated to determine if Nearest Neighbor analysis met minimum requirements for a statistically valid run and would be considered dependable for environmental analysis modeling. Checks for statistical validity and quality passed. Refer to Nearest Neighbor Report within Austin Project record for statistical information validating the model run.

Assumptions for estimating effects include:

- Historical range of variability approximates desired future condition.
- Future climate will be within the current range of variation.
- Current insects and diseases will continue to inhabit the forest, and populations will fluctuate depending on stand conditions.
- Current trends in forest stand composition, structure, and density will continue, assuming that no further mechanical vegetation management would occur.
- Regeneration resulting from opening up stands in dry upland forest potential vegetation group would be kept at low levels by periodic underburning.

Assumptions for FSVeg Data Analyzer model include:

- Mechanical treatments in the proposed action are only applied once, at the start of the modeling time period. They are not repeated within the 40-year modeling cycle.

- Prescribed burning in the proposed action is only applied once in the first 10-year cycle.
- Stands without mechanical treatment or prescribed fire are grown using the assumptions for the no action alternative.
- No other disturbances occur that result in stand replacement (some examples include wildfire, insects, and wind).

Spatial and Temporal Context

Austin planning area is the spatial boundary used for direct and indirect effects analysis. This boundary includes private and National Forest System lands.

The forest vegetation simulator model, with the Blue Mountains variant, was used to model stands and then apply prescriptions to proposed stands to project stand growth and development over 40 years. All mechanical treatments proposed within Austin planning area, as well as the first application of prescribed burning, were simulated in this analysis. Forest vegetation simulator projections were then used to compare resource measures between the no action and proposed action alternatives.

Short-term direct and indirect effects were measured via the model 2 years after mechanical treatments. Long-term direct and indirect effects were measured 10 and 40 years into the future. The timeframe for cumulative effects is relatively long-term for forest development and includes cumulative effects of past logging and current restoration treatments. Long-term projections become estimates at best; however, results do show trends that are useful for comparing the no action alternative and proposed action.

The above modeling constraints are used to simplify analysis and are only for comparative purposes between the no action alternative and proposed action. They are not intended to accurately predict future conditions. Based on best available science and professional knowledge, it is reasonable to assume that climate change and future disturbances will occur that will affect vegetation in Austin planning area. However, due to uncertainty and unpredictability of these events, or how forest vegetation will respond to them, they were not incorporated in this analysis.

The spatial boundary used for cumulative effects analysis includes National Forest System lands from Austin planning area moving down Middle Fork John Day River drainage to the boundary of National Forest System lands adjacent to Bear Creek and Big Creek drainages. This includes the area encompassing the following recent past projects: Big Mosquito, Camp Lick, Galena, Ragged Ruby, and Summit and Reed Fire Restoration. The temporal boundary includes past projects leading up to existing conditions within each of these recent project areas, as well as the 40-year long-term analysis period for each project.

Past activities that have cumulative effects to forest vegetation within Austin planning area include historic timber harvest, more recent timber harvest from the 1970s through the 1990s, fire suppression, wildfire, timber salvage, planting following regeneration harvest and wildfire, and grazing.

Portions of Austin planning area that have been recently treated include Crawford timber sale and prescribed burning; Crawford Aspen Project; and precommercial thinning in plantations and other forested stands. Other previous timber harvest sales from the past 20 years within Austin planning area include: Clear Creek, Clear Salvage, Dry Fork, Easy Fire Recovery, Olmstead Timber Sale, and Pog-Pogo Timber Sale.

Previous forest restoration projects that have treated both sides of the landscape along Middle Fork John Day River drainage include Big Mosquito, Camp Lick, Galena, and Ragged Ruby. These projects were designed to thin and treat fuels across the landscape to provide increased tree growth and vigor, decreased fire hazard, and increased wildlife habitat.

Collectively, these projects' silvicultural treatments were intended to reduce stand density; shift species composition by reducing abundance of late seral species; and move forest structure closer to historical range of variability through commercial and noncommercial mechanical methods and prescribed burning.

Potentially Affected Environment

The planning area is dominated by three potential vegetation groups: cold upland forest (primarily lodgepole pine); dry upland forest (ranging from scablands and ponderosa pine to mixed conifer); and moist upland forest (generally mixed conifer dominated by grand fir) (see Table 3). These three potential vegetation groups were used for the historical range of variability analysis. Other potential vegetation groups and non-forested areas combined account for approximately 4,000 acres (5 percent) of the planning area.

Table 3. Potential vegetation groups[15] used for historical range of variability analysis across planning area.

Potential Vegetation Group	Acres (approximate)	Percent Total Area
Cold Upland Forest	33,032	42
Dry Upland Forest	35,462	45
Moist Upland Forest	5,843	7

The FSVeg Spatial Data Analyzer analysis described above was used to assign structural stages to all forested stands within the planning area. These structural stages are adapted from O'Hara et al. (1996). Five structural stages were used for this analysis compared to the seven presented in O'Hara et al. (1996). Young multi-strata[16] and understory reinitiation[17] have been combined into understory reinitiation. Open stem exclusion[18] and closed stem exclusion[19] have been combined into stem exclusion. The other stages are stand initiation, old forest multi-strata, and old forest single-stratum. The Forest has consistently defined old forest stands as having 10 or more trees per acre 21 inches or larger diameter at breast height.

Currently, old forest multi-strata is the only structural stage within historical range of variability. Stand initiation and old forest single-stratum are currently below historical range of variability, and stem exclusion and understory reinitiation are currently above.

[15] Potential vegetation groups are composed of plant associations found in the Blue Mountains and represent temperature and moisture regimes (Countryman and Justice 2010).
[16] Young multi-strata refers to the structural class at which two or more cohorts are present after periodic disturbances, including harvest events (O'Hara et al. 1996).
[17] Understory reinitiation refers to the structural class at which the initiation of a new cohort occurs, and the older cohort occupies less than full growing space (O'Hara et al. 1996).
[18] Open stem exclusion refers to the structural class at which below-ground competition limits the establishment of new trees (O'Hara et al. 1996).
[19] Closed stem exclusion refers to the structural class at which establishment of new trees is limited by below ground competition or competition for light (O'Hara et al. 1996).

Table 4. Percent of acres within each structural stage for dry upland forest potential vegetation group compared to historical range of variability.

Structure	Percent Acres	Historical Range of Variability (Percent)
Stand Initiation	2	15 to 25
Stem Exclusion	32	10 to 20
Understory Reinitiation	49	5 to 10
Old Forest Single-Stratum	3	40 to 60
Old Forest Multi-Strata	14	5 to 15

Table 5 displays how existing structure in the cold upland forest potential vegetation group compares to historical range of variability. Currently, stem exclusion and old forest single-stratum are the only structural stages within historical range of variability. Stand initiation and old forest multi-strata are currently below historical range of variability, and understory reinitiation is currently above.

Table 5. Percent of acres within each structural stage for cold upland forest potential vegetation group compared to historical range of variability.

Structure	Percent Acres	Historical Range of Variability (Percent)
Stand Initiation	3	20 to 45
Stem Exclusion	26	10 to 30
Understory Reinitiation	59	10 to 25
Old Forest Single-Stratum	9	5 to 20
Old Forest Multi-Strata	3	10 to 25

Table 6. displays how existing structure in the moist upland forest potential vegetation group compares to historical range of variability. Stand initiation and old forest single-stratum are currently below historical range of variability. Stem exclusion, understory reinitiation, and old forest multi-strata are currently above.

Table 6. Percent of acres within each structural stage for moist upland forest potential vegetation group compared to historical range of variability.

Structure	Percent Acres	Historical Range of Variability (Percent)
Stand Initiation	4	20 to 30
Stem Exclusion	45	20 to 30
Understory Reinitiation	26	10 to 20
Old Forest Singel-Stratum	1	10 to 20
Old Forest Multi-Strata	24	15 to 20

Malheur Forest Plan, as amended by Eastside Screens, provides the basis for actively addressing restoration of forest structure towards historical range of variability and moving the area towards a more resistant and resilient landscape.

Environmental Impacts

No Action Alternative

Given no action, Austin planning area would continue to grow on its current trajectory and forest structure would generally shift over time from fewer acres within younger structural stages to more acres within late and old structure (old forest single-stratum and old forest multi-strata).Table 7. displays how the percentage within each structural stage would change throughout the analysis period in the dry upland forest potential vegetation group, and how that compares to historical range of variability.

Stand initiation would continue to decrease and would remain below historical range of variability. Old forest single-stratum would continue to increase but would not reach the lower end of historical range of variability within the next 40 years. Old forest multi-strata would continue to increase and would be much greater than historical range of variability within the next 40 years.

Table 7. No action alternative percent of acres within each structural stage for dry upland forest potential vegetation group currently, 10 years in the future, and 40 years in the future compared to historical range of variability.

Structure	Existing Percent	Percent 10 Years in the Future	Percent 40 Years in the Future	Historical Range of Variability
Stand Initiation	2	1	0	15 to 25
Stem Exclusion	32	16	10	10 to 20
Understory Reinitiation	49	53	23	5 to 10
Old Forest Single-stratum	3	7	10	40 to 60
Old Forest Multi-strata	14	23	56	5 to 15

For cold upland forest potential vegetation group, stand initiation would continue to decrease and would remain below historical range of variability (Table 8). Old forest single-stratum would continue to increase to above historical range of variability within the next 40 years. Old forest multi-strata would continue to increase and would be within the historical range of variability within the next 40 years.

Table 8. No action alternative percent of acres within each structural stage for cold upland forest potential vegetation group currently, 10 years in the future, and 40 years in the future compared to historical range of variability.

Structure	Existing Percent	Percent 10 Years in the Future	Percent 40 Years in the Future	Historical Range of Variability
Stand Initiation	3	1	1	20 to 45
Stem Exclusion	26	16	9	10 to 30
Understory Reinitiation	59	62	43	10 to 25
Old Forest Single-stratum	9	10	25	5 to 20
Old Forest Multi-strata	3	11	22	10 to 25

For moist upland forest potential vegetation group, stand initiation would continue to decrease and would remain below historical range of variability (Table 9). Old forest single-stratum would increase slightly but would not reach the lower end of historical range of variability within the next 40 years. Old forest multi-strata would continue to increase and would be much greater than historical range of variability within the next 40 years.

Table 9. No action alternative percent of acres within each structural stage for moist upland forest potential vegetation group currently, 10 years in the future, and 40 years in the future compared to historical range of variability.

Structure	Existing Percent	Percent 10 Years in the Future	Percent 40 Years in the Future	Historical Range of Variability
Stand Initiation	4	1	0	20 to 30
Stem Exclusion	45	45	26	20 to 30
Understory Reinitiation	26	21	12	10 to 20
Old Forest Single-stratum	1	2	2	10 to 20
Old Forest Multi-strata	24	31	60	15 to 20

Proposed Action

Direct and Indirect Effects

Directly after mechanical treatments are applied to stands within Austin planning area, stem exclusion and old forest single-stratum in the dry upland forest potential vegetation group would increase in proportion, while understory reinitiation and old forest multi-strata would decrease and stand initiation would remain the same. Treatments would bring understory reinitiation, old forest single-stratum, and old forest multi-strata either within or closer to historical range of variability directly after treatment.

Stem exclusion would increase initially, moving it further from historical range of variability and stand initiation would remain the same. However, after 40 years, stem exclusion would be the only structural stage within historical range of variability. The remaining structural stages would

be closer to historical range of variability within the next 40 years than for the no action alternative.

Table 10. Proposed action percent of acres within each structural stage for dry upland forest potential vegetation group currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment compared to historical range of variability.

Structure	Existing Percent	Percent Immediately After Treatment	Percent 10 Years Post-treatment	Percent 40 Years Post-treatment	Historical Range of Variability
Stand Initiation	2	2	2	1	15 to 25
Stem Exclusion	32	58	44	18	10 to 20
Understory Reinitiation	49	22	28	19	5 to 10
Old Forest Single-stratum	3	7	12	29	40 to 60
Old Forest Multi-strata	14	10	14	33	5 to 15

Directly after mechanical treatment in cold upland forest potential vegetation group, stand initiation and stem exclusion would increase in proportion, while understory reinitiation, old forest single-stratum, and old forest multi-strata would decrease (Table 11). Treatments would bring stand initiation, understory reinitiation, and old forest single-stratum either within or closer to historical range of variability directly after treatment.

Stem exclusion would increase initially, moving it further from historical range of variability and old forest multi-strata would decrease, moving it further from historical range of variability. However, after 40 years, stem exclusion, old forest single-stratum, and old forest multi-strata would be within historical range of variability. Stand initiation would be closer to historical range of variability than the no action alternative, and understory reinitiation would be the same as the no action alternative within the next 40 years.

Table 11. Proposed action percent of acres within each structural stage for cold upland forest potential vegetation groups currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment compared to historical range of variability.

Structure	Existing Percent	Percent Immediately After Treatment	Percent 10 Years Post-treatment	Percent 40 Years Post-treatment	Historical Range of Variability
Stand Initiation	3	16	12	8	20 to 45
Stem Exclusion	26	45	31	16	10 to 30
Understory Reinitiation	59	31	43	43	10 to 25
Old Forest Single-stratum	9	7	10	20	5 to 20
Old Forest Multi-strata	3	1	4	13	10 to 25

Directly after mechanical treatment in moist upland forest potential vegetation group, stand initiation, stem exclusion, and old forest single-stratum would increase in proportion, while understory reinitiation and old forest multi-strata would decrease (Table 12). Treatments would

bring stand initiation, understory reinitiation, old forest single-stratum, and old forest multi-strata either within or closer to the historical range of variability directly after treatment.

Stem exclusion would increase initially, moving it further from historical range of variability. After 40 years, understory reinitiation would be the only structural stage within historical range of variability. The rest of the structural stages, except for stem exclusion, would be closer to historical range of variability within the next 40 years than for the no action alternative.

Table 12. Proposed action percent of acres within each structural stage for moist upland forest potential vegetation group currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment compared to historical range of variability.

Structure	Existing Percent	Percent Immediately After Treatment	Percent 10 Years Post-treatment	Percent 40 Years Post-treatment	Historical Range of Variability
Stand Initiation	4	8	6	4	20 to 30
Stem Exclusion	45	58	50	33	20 to 30
Understory Reinitiation	26	15	18	17	10 to 20
Old Forest Single-stratum	1	3	5	8	10 to 20
Old Forest Multi-strata	24	16	21	39	15 to 20

Proposed mechanical treatments affect most structural stages within each potential vegetation group by moving the proportion of each structural stage either within or closer to historical range of variability directly after treatment and in the long-term.

Cumulative Effects

Effects from past timber harvest, fire suppression, grazing, wildfire, and planting have created predominantly young, overstocked stands that currently persist across the planning area. These effects are reflected in the existing condition. Implementing mechanical treatments and prescribed burning as described in the proposed action would increase the amount of old forest single-stratum and old forest multi-strata structure and reduce the amount of stem exclusion and understory reinitiation over the long-term within the planning area for all potential vegetation groups. Reducing stem exclusion and understory reinitiation would lessen inter-tree competition and create more room for trees to grow large and stay healthy. The proposed action would mechanically treat approximately 43,900 acres (approximately 58 percent) of Austin planning area.

The actions proposed within Austin planning area, as well as past, ongoing, and reasonably foreseeable actions (See Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions), would cumulatively affect Middle Fork John Day River drainage. Collectively, these projects would mechanically treat approximately 46 percent of Middle Fork John Day River drainage landscape over approximately 25 years. All treatments are designed to manage for and promote health and resilience of large and old early seral trees, to increase old forest structure across the landscape, and to collectively move forest structure towards historical range of variability. Over a 40-year period, these actions combined would shift proportions of old forest structure to be within or above historical range of variability for this landscape, increasing resiliency in Middle Fork John Day River drainage.

Table 13. Past, ongoing and foreseeable actions that cumulatively overlap in time and space with Austin Project structural stage effects.

Project	Acres Treated (approximately)	Past, Ongoing, and Foreseeable Actions
Balance Wildland Urban Interface Project	1,000	Past
Crawford Environmental Impact Statement	2,000	Past
Galena Environmental Impact Statement	8,300	Past
Plantation Maintenance and Summit and Reed Fire Restoration	18,600	Ongoing
Big Mosquito Environmental Assessment	9,400	Ongoing
Camp Lick Environmental Assessment	14,000	Ongoing
Ragged Ruby Environmental Impact Statement	8,800	Ongoing
Austin Environmental Impact Statement	42,710	Foreseeable

Stand Density

Methodology

Stand density uses the same methodology as described for Structural Stages above, including spatial and temporal context.

Potentially Affected Environment

Tree density is a characterization of tree stocking for an area. It expresses the number of tree stems occupying a unit of land. Stocking can be expressed as a "stand density index" or in some other measure of relative density, or it can be quantified in absolute terms as the number of trees per acre or as the amount of basal area, wood volume, or canopy cover in an area (Powell 1999).

Stand density index is a common measure of density that allows comparisons across units independent of individual tree age or size (Powell 1999). For any given average tree size for each species, there is a limit to the number of trees per acre that may coexist in a stand. That limit is known as the maximum stand density index. The percent of maximum stand density index is an index of intra-tree competition for site resources and is an indication of overall stand health, including tree growth and mortality, susceptibility to mortality from insects and diseases, and high severity wildfire.

Percent maximum stand density index is generally divided into categories that define tree growth, stand growth, and mortality. Below the management zone (0 to 35 percent maximum stand density index), there may be natural regeneration and there is generally high individual tree growth within the stand. Within the management zone (35 to 60 percent maximum stand density index) is where silviculturists tend to prescribe management activities because site resources are generally being captured into tree growth and there is high stand growth. Above the management zone (greater than 60 percent maximum stand density index) is where consistent competition-induced mortality begins to occur and stands eventually stagnate. As stands grow above the management zone, susceptibility to insect infestation (Figure 1) and high-severity stand replacement wildfire (Figure 2) increases.

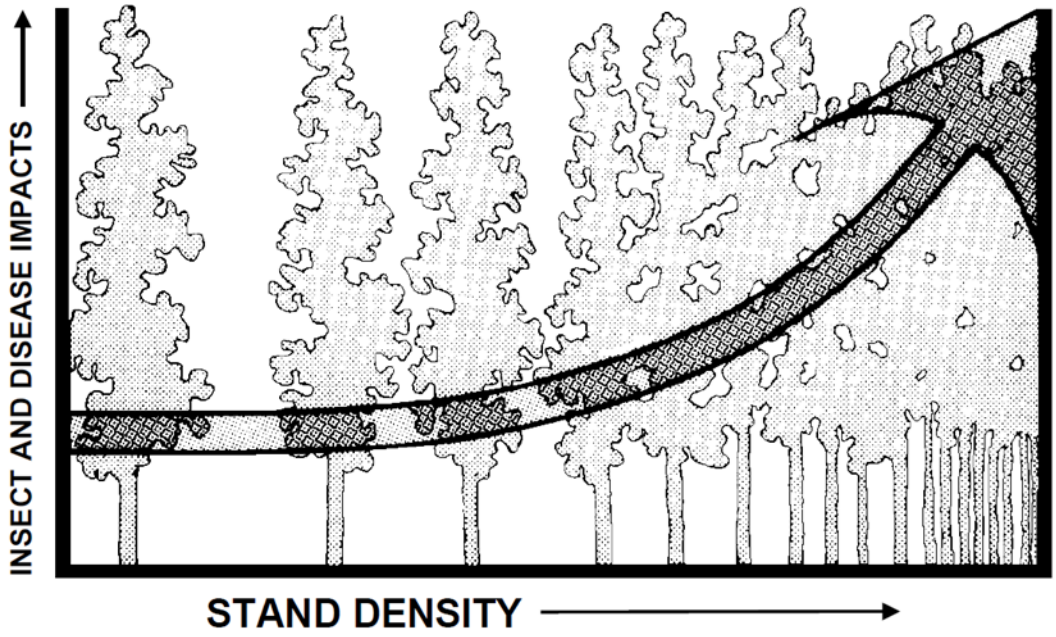

Figure 1. Insect and disease impacts related to stand density (Powell 1999).

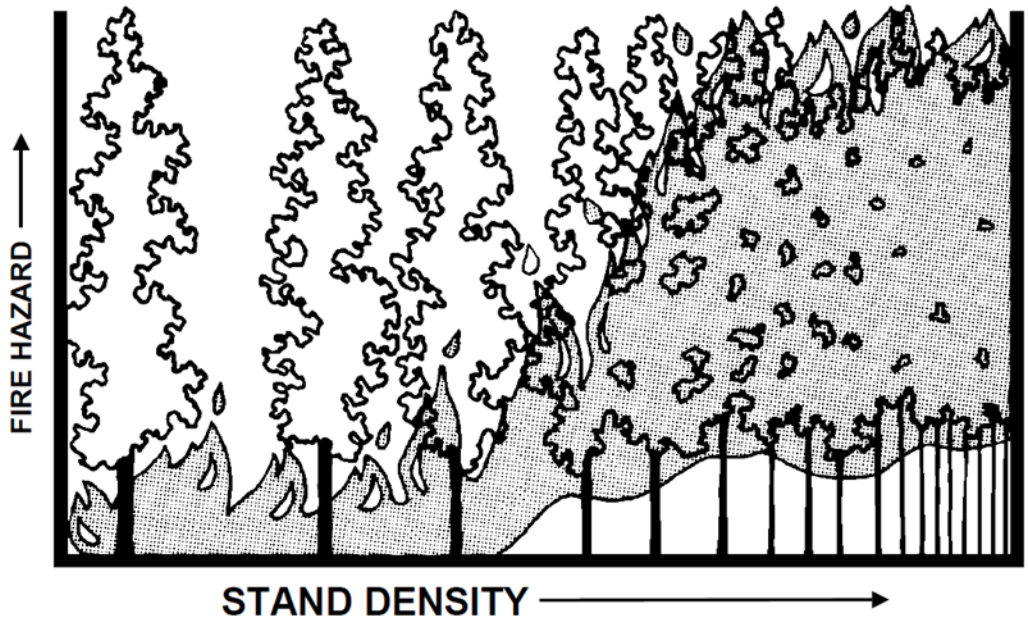

Figure 2. Fire hazard as related to stand density (Powell 1999)

Table 14 shows the percentage of area within Austin planning area below, within, and above the management zone. Approximately 78 percent of Austin planning area is above the management zone, with high stand densities susceptible to competition-induced mortality, insect and disease infestation, and high severity wildfire.

Table 14. Existing condition percent of acres below, within, and above the management zone.

Management Zone	Existing Percent (as of 2022)
Below	6
Within	16
Above	78
Total	100

Due to high stand densities within Austin planning area, mountain pine beetle within lodgepole pine and western larch dwarf mistletoe are very active and are creating pockets of high mortality within these tree species.

Malheur Forest Plan Forest-wide standard 98 provides direction to "Maintain stand vigor through the uses of integrated pest management such as stocking level control and species composition in order to minimize losses due to insects and disease" (USDA Forest Service 1990a page IV-37). Stands within management area 1 (general forest) of the Malheur Forest Plan are desired to be within the management zone.

It is acceptable for other management areas to have stands above the management zone, such as management area 13 (Old Growth). These old growth areas of the Forest provide habitat for wildlife species dependent on mature and overmature forest conditions (USDA Forest Service 1990a). The desired condition for stand density is to have most of the stands within Austin planning area below or within the management zone to increase resilience, and to decrease the risk of largescale, stand replacement wildfire and insect and disease outbreaks.

Recommendations for stand density were provided by Blue Mountains Forest Insect and Disease Service Center and include thinning to the lower limit of the management zone. "Thinning increases light, nutrient, and water availability to the remaining trees, and this improved tree vigor increases the ability of trees to resist attacks from bark beetles and injury from root diseases" (Johnson and Williams 2017).

Other recommendations include thinning lodgepole pine stands and removing heavily infected mistletoe trees. Reducing stand densities in lodgepole pine stands would increase tree vigor and improve moisture status so that residual trees could better defend themselves from bark beetles. "Larch with little infection, or infections low in the crown, should be favored along with lightly infected Douglas-fir and ponderosa pine. They also recommended removing trees, particularly regeneration, within a 30-foot radius from around overstory ponderosa pine selected for retention, to eliminate fuel ladders, reduce competition for soil moisture, and promote vigor and resistance to mortality agents of these leave-trees" (Johnson and Williams 2017).

Environmental Impacts

No Action Alternative

Given no action, Austin planning area would continue to grow on its current trajectory and forested stands would continue to be overstocked. The proportion of the planning area above the management zone would increase from approximately 78 percent currently to approximately 94 percent within the next 40 years (Table 15). Tree mortality from insects and disease is expected to increase, as well as the risk of largescale, stand-replacement wildfire.

Table 15. No action alternative percentage of acres below, within, and above the management zone currently, 10 years in the future, and 40 years in the future.

Management Zone	Existing Percent	Percent 10 Years in the Future	Percent 40 Years in the Future
Below	6	1	1
Within	16	12	5
Above	78	86	94
Total	100	100	100

Proposed Action

Direct and Indirect Effects

Directly after mechanical treatments are applied, the proportion of the planning area below and within the management zone increases, while the proportion above the management zone decreases by over half. Throughout the 40-year analysis period, stand densities increase through time, moving the area to lower proportions below the management zone and higher proportions within and above the management zone. In approximately 40 years, approximately 54 percent of the planning area would be above the management zone for the proposed action.

Table 16. Proposed action percentage of acres below, within, and above the management zone currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment.

Management Zones	Existing Percent	Percent Immediately After Treatment	Percent 10 Years Post-treatment	Percent 40 Years Post-treatment
Below	6	44	34	14
Within	16	25	27	32
Above	78	32	39	54
Total	100	100	100	100

Cumulative Effects

Cumulatively, across Middle Fork John Day River drainage, directly after treatment, there would be a decrease in the proportion of high density stands of approximately 30 percent. Analyses also indicate that compared to taking no action, 40 years after treatment, there is a remaining effect on stand density, and the proportion of the area either below or within the management zone (indicating lower stand densities) cumulatively is increased by approximately 30 percent. Decreasing stand density across Middle Fork John Day River drainage increases individual tree vigor and stand health and resilience to disturbance, more effectively meeting the purpose and need of the Austin planning area and previous planning areas within this drainage.

Species Composition

Methodology

The FSVeg Spatial Data Analyzer analysis described previously in Structural Stages was used to determine species composition in Austin planning area. Spatial and temporal context is also the same as described for Structural Stages. Species composition was calculated for trees per acre and basal area per acre as a weighted average by stand size for each tree species.

Tree species were then summed by group. Ponderosa pine and western larch were grouped together as early seral species. Douglas-fir, grand fir, and lodgepole pine were grouped together

as late seral within the planning area. Other species that were not common but were found within the planning area included western white pine, western juniper, subalpine fir, and Engelmann spruce.

Potentially Affected Environment

Ponderosa pine and western larch are currently approximately 18 percent of the trees per acre and approximately 31 percent of the basal area per acre within Austin planning area. Douglas-fir, grand fir, and lodgepole pine are approximately 80 percent of the trees per acre and approximately 68 percent of the basal area per acre, while other species are approximately 2 percent and 1 percent, respectively.

Historically, the frequent low-severity fire regime that was prevalent in this landscape maintained more early seral fire-adapted species. Today, these species are underrepresented, and late seral species have expanded into areas where they were not historically present. Ponderosa pine and western larch are early seral tree species that are relatively resistant to insects and disease, as well as low-severity fire. The desired condition for Austin planning area is to reduce ingrowth of grand fir and lodgepole pine that are highly susceptible to insect and disease activity, and to shift species composition from predominantly late seral tree species to predominantly early seral tree species. Shifting species composition would increase resiliency within Austin planning area to disturbances such as insects, disease, and wildfire, and would move the planning area towards historical range of variability.

Environmental Impacts

No Action Alternative

Given no action, Austin planning area would continue to grow on its current trajectory and species composition would generally remain the same over time unless impacted by some natural disturbance such as wildfire. The model indicates that there would collectively be a slight increase in trees per acre of early seral species, and there would collectively be a slight decrease in late seral species over the next 40 years. This slight decrease in late seral species is due to a decrease in lodgepole pine due to mortality from mountain pine beetles.

Over time, early seral species would have a slight decrease in total basal area. Early seral species generally have a greater proportion of larger trees that account for more basal area compared to late seral species. This slight increase in trees per acre and decrease in basal area over time indicates mortality of large trees potentially from drought, insects, or disease.

Table 17. No action alternative species composition in Austin planning area currently, 10 years in the future, and 40 years in the future.

Species	Existing Percent Trees per Acre	Percent Trees per Acre 10 Years in Future	Percent Trees per Acre 40 Years in Future
Early Seral	18	19	19
Late Seral	80	79	79
Other	2	2	2

Table 18. No action alternative basal area of species composition in Austin planning area currently, 10 years post-treatment, and 40 years post-treatment.

Species	Existing Percent Basal Area per Acre	Percent Basal Area per Acre 10 years in Future	Percent Basal Area per Acre 40 Years in Future
Early Seral	31	31	30
Late Seral	68	68	68
Other	1	1	1

Proposed Actions

Direct and Indirect Effects

Directly after mechanical treatments are applied, the percentage of trees per acre of early seral species would increase by 8 percent. The percentage of trees per acre of late seral species would decrease by 10 percent. Throughout the 40-year analysis period, the percentage of early seral species would continue to increase another 4 percent, and the percentage of late seral species would continue to decrease another 4 percent.

In approximately 40 years, early seral species are projected to increase to approximately 30 percent of the total trees per acre, and late seral species are projected to decrease to approximately 66 percent. This is a shift towards the desired condition of increasing the proportion of early seral species across the planning area compared to the no action alternative, which would be 19 percent early seral species and 79 percent late seral species currently.

Directly after mechanical treatment, the percentage of basal area per acre of early seral species would increase by 13 percent. The percentage of basal area per acre of late seral species would decrease by 13 percent. Throughout the 40-year analysis period, the percentage of early seral species would remain constant, and the percentage of late seral species would continue to decrease another 1 percent.

In approximately 40 years, early seral species are projected to increase to approximately 44 percent of the total basal area per acre, and late seral species are projected to decrease to approximately 54 percent. This is a shift towards the desired condition of increasing the proportion of early seral species across the planning area compared to the no action alternative, which would be 30 percent early seral species and 68 percent late seral species currently.

Table 19. Proposed action species composition in Austin planning area currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment.

Species	Existing Percent Trees per Acre	Percent Trees per Acre Immediately After Treatment	Percent Trees per Acre 10 Years Post-treatment	Percent Trees per Acre 40 Years Post-treatment
Early Seral	18	26	28	30
Late Seral	80	70	69	66
Other	2	3	3	4

Table 20. Proposed action basal area of species composition in Austin planning area currently, immediately after treatment, 10 years post-treatment, and 40 years post-treatment.

Species	Existing Percent Basal Area per Acre	Percent Basal Area per Acre Immediately After Treatment	Percent Basal Area per Acre 10 Years Post-treatment	Percent Basal Area per Acre 40 Years Post-treatment
Early Seral	31	44	44	44
Late Seral	68	55	54	54
Other	1	1	2	2

Cumulative Effects

Effects from past practices have created predominantly young, overstocked stands of late seral species that currently persist across the planning area. These effects are reflected in the existing condition. Mechanical treatments and prescribed burning proposed would effectively shift species composition directly after treatment and in the long-term compared to taking no action, as described in the Direct and Indirect Effects section above. On average, the change in proportions of early seral species and late seral species across Middle Fork John Day River basin would increase and decrease by approximately 3 to 4 percent, respectively, over the 40 years following treatment. Through time, due to natural regeneration, seed tree regeneration harvest, and mortality, the changes in proportions would be expected to increase slightly.

Similar trends would exist for basal area per acre, but to a greater extent as early seral trees on average are consistently larger than late seral trees across the analysis area. Proposed treatments within the proposed action would move Austin planning area and Middle Fork John Day River drainage slightly closer towards the purpose and need of shifting species composition to better reflect historical ranges.

Smoke Emissions

This section describes the effects of smoke emissions on air quality and public health from prescribed burning (understory burning), pile burning, and jackpot burning.

This analysis is framed by the following measures: tons of carbon monoxide, carbon dioxide, nitrous oxide, and sulfur dioxide particulate matter released. This analysis will also disclose potential short-term and long-term health impacts.

Greenhouse Gas Emissions

Methodology

Smoke emissions, including greenhouse gas emissions, were calculated for machine pile burning, jackpot burning, understory burning, and wildfires.

Emissions were calculated using the formula [Ei (tons) equals (A multiplied by FL multiplied by percent C multiplied by EFi) all divided by 2,000 to convert pounds to tons]; where:

- Ei equals emissions in tons for the emission type (for example, PM2.5, NOx, or CH4);
- A equals area in acres;
- FL equals fuel loading in tons per acre;
- Percent C equals percent fuel consumed; and,

- EFi equals emission factor for the type (in pounds per ton of dry fuel consumed).

Additionally, it is assumed that:

- Combustion for pile burning would be 100 percent.
- Combustion for jackpot burning would be 50 percent.
- Combustion for understory burning would be 50 percent.
- Jackpot burns are similar to understory burns.
- Emission factors for pile, understory, and jackpot burns were derived from Hardy et al. (2001a, and 2001b): PM10 equals (12.4, 25), PM2.5 equals (10.8, 22), CH4 equals (11.4, 8.2), NMHC equals (8, 6.4), CO equals (153, 178), CO2 equals (3271, 3202), NOx equals (6, 6), and SOx equals (2.4, 2.4).
- Global warming potential factor for greenhouse gas conversion to CO2 tons is derived from Solomon et al. (2007).
- Wildfire emissions were based on a wildfire burning under 90th percentile weather conditions at year 20 for all scenarios.

Data sources used for assessing effects to air quality were derived from the first order fire effects monitoring program (Reinhardt et al. 1997), EPA (2019), Solomon et al. (2007), and Springsteen et al. (2011).

Spatial and Temporal Context

Air quality analysis considers potential impacts to communities within 20 miles of the planning area including Austin, Bates, Prairie City, Galena, Unity, and Sumpter. These are the communities that would be most impacted by the activities proposed. Temporal bounds are limited to the implementation phase of the project as direct, indirect, and cumulative effects would be limited to the timeframe in which proposed activities would occur.

To understand the contribution of past actions to cumulative effects of the proposed and no action alternatives, this analysis relies on current environmental conditions as a proxy for impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Potentially Affected Environment

The Clean Air Act lists 189 hazardous air pollutants to be regulated. Some components of smoke, such as polycyclic aromatic hydrocarbons (PAH) are known to be carcinogenic. Generally, the most carcinogenic component is benzo-a-pyrene (BaP). Other components, such as aldehydes, are acute irritants. In 1994 and 1997, 18 air toxins were assessed relative to the exposure of humans to smoke from prescribed and wildland fires. The five toxins most commonly found in prescribed and wildland fire smoke were:

- Particulate matter (PM) – Particulates are the most prevalent air pollutant from fires and are of the most concern to regulators. Research indicates a correlation between hospitalizations for respiratory problems and high concentrations of fine particulates (PM2.5, fine particles that are 2.5 microns in diameter or less). Particulates can carry

carcinogens and other toxic compounds. Overexposure to particulates can cause irritation of mucous membranes, decreased lung capacity, and impaired lung function.

- Methane (CH4) – Methane is an odorless, colorless flammable gas. Short-term exposure to methane may result in headaches or feeling tired or dizzy. There are no long-term health effects currently associated with exposure to methane.
- Carbon monoxide (CO) – Carbon monoxide reduces the oxygen carrying capacity of the blood, a reversible effect. Breathing air with a high concentration of carbon monoxide reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain. Exposure can lead to heart attacks, especially for persons with heart disease. At very high levels, carbon monoxide can cause dizziness, confusion, unconsciousness, and death.
- Carbon dioxide (CO2) – Carbon dioxide exposure can lead to dizziness, headache, visual and hearing dysfunction, unconsciousness, and death. Carbon dioxide is the most significant long-lived greenhouse gas in Earth's atmosphere.
- Nitrous oxide (N2O) - Nitrous oxide is a greenhouse gas that contributes to climate change. Small levels can cause nausea, irritated eyes or nose, fluid forming in lungs, and shortness of breath. Breathing high levels can lead to rapid, burning spasms; swelling of the throat; reduced oxygen intake; a larger buildup of fluids in lungs; or death.

Environmental Impacts

No Action Alternative

There would be no significant change in expected fire behavior on the landscape in the short-term. Stands would continue to be at risk from stand-replacement fire. With continued surface fuel accumulation, it is likely that surface fire intensity and crown fire potential would increase over the long-term.

This alternative would have the least immediate impact on air quality, as there would be no prescribed burning or pile burning. All biomass would remain available for consumption by wildfires and would continue to accumulate, increasing potential for large amounts of wildfire smoke during summer months, when diurnal inversions can concentrate smoke at low elevations. Because wildfires tend to occur at the driest time of year, they more completely consume fuels and typically produce three to five times more emissions than early or late season prescribed fires.

There is potential for wildfire to produce approximately 0.6 tons per acre of particulate matter emissions and 54 tons per acre of carbon dioxide. This is approximately 4,319,113 total tons of greenhouse gas emissions for wildfire. These smoke concentrations can have high particulate levels that can cause health problems or violate summertime class 1 air quality visibility standards for wilderness areas. Smoke from wildfire could potentially affect communities as listed in the Spatial and Temporal Context section above.

Proposed Action

Direct and Indirect Effects

Prescribed burning would follow guidance provided by Oregon Smoke Management Plan and all other applicable federal, state, and local air quality regulations. Emissions from a wildfire are

generally three to five times greater than from a prescribed burn. Prescribed burning is restricted by total tons per acre allowed to burn daily, wind direction, and cumulative smoke concentrations from all burning in an airshed. These limits are published daily by Oregon Department of Forestry. Emissions from pile burning would occur outside the time of year that underburning occurs.

There may be short-term impacts to communities and residences downwind and in drainages adjacent to prescribed fire. This may include communities listed in the Spatial and Temporal Context section above. Prescribed burning in this area has shown that diurnal winds settle smoke in low areas and valley bottoms.

Prescribed burning may impact highway and National Forest System road visibility for approximately 3 to 4 days, potentially impacting driver safety. Signing roadways would reduce risk. If driving conditions warrant, Oregon Department of Transportation or Grant County Road Department would be contacted to flag traffic or use pilot cars.

Smoke-sensitive areas including John Day, Oregon (approximately 20 air miles southwest of the planning area), the La Grande Basin, Oregon (approximately 45 air miles northeast of the planning area), and the north half of Ada County, Idaho (approximately 160 air miles southeast of the planning area) may be affected by prescribed burning because of transport winds; however, these impacts are expected to be minimal because of smoke dilution over time and space. Weather forecasts would be obtained prior to burning to ensure the Strawberry Mountain Wilderness would not be affected by prescribed burning during visibility protection periods (July 1 to September 1). Approximately 2.4 million tons of greenhouse gases would be created in this alternative from pile burning, prescribed burning, and wildfire over the life of the project.

Cumulative Effects

There is potential for cumulative effects from prescribed burning occurring at the same time in nearby units. Currently, two other projects are being implemented near Austin Project: Galena and Dads Creek Wildland Urban Interface. Total emissions produced from concurrent projects on National Forest System lands would meet air quality standards.

It is likely that only a few projects, in isolated areas, would undergo burning at the same time. The dilution of smoke over time and space from concurrent burning would limit cumulative effects. All burning would be coordinated to reduce cumulative effects and meet all applicable laws and regulations. Therefore, cumulative effects of multiple prescribed burning projects would not cause air quality to decline outside of standards.

Old Forest and Large Tree Structure Habitats and Associated Wildlife Species

This section analyzes to what degree vegetation and fuels treatments may impact old forest and large tree structure habitats and associated wildlife. It displays the measures, specific standards or thresholds applicable, and the source. More details on methods of analysis; an assessment of potential effects; and cumulative effects to specific wildlife species which use snags or old forest habitat are available in the full Wildlife Report in the project record. For a summary of compliance for wildlife species, see the National Forest Management Act section in Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy.

Wildlife Connectivity

Methodology

Malheur Forest Plan requires connectivity corridors be designated during project planning to serve as connectivity between late and old structure stands; to allow for movement of old growth species and big game migratory and dispersal movements; and to retain cover. Malheur Forest Plan standard and goal of "connectivity" is to: manage forested stands in corridors with medium and larger trees that have greater canopy coverage when compared to more intensively managed stands located outside of corridors; and to ensure that all late and old structure stands and dedicated old growth stands (management area 13) are connected in at least two different directions.

Connectivity should connect to late and old structure and dedicated old growth in the adjacent watershed to ensure a contiguous network pattern across watersheds. Connectivity corridor stands should be at least 400 feet wide at their narrowest point, when available, and connections should be as short as possible. Certain types of non-regeneration or single-tree selection harvest would be permitted if some amount of understory was left in patches or scattered to support density and cover and meet additional specific requirements to protect wildlife habitat such as snags and downed wood.

Late and old structure is defined for the Forest as either being old forest single-stratum or old forest multi-strata as adapted from O'Hara et al. (1996) and as having 10 or more trees per acre of trees 21 inches or larger diameter at breast height. We identified late and old structure stands within Austin planning area using a variety of methods. First, structure was modeled using FSVeg Spatial Data Analyzer Nearest Neighbor process to identify old forest single-stratum and old forest multi-strata stands. This process and the assumptions included in the model are described in detail in the Structural Stages measure of the Issues Considered for Analysis section.

Then, late and old structure stands were verified using LiDAR[20] stem mapping and field visits. LiDAR stem mapping included mapping of all trees greater than approximately 90 feet tall to represent trees 21 inches or larger diameter at breast height. Through stem mapping and field verification, modeled late and old structure stands were either confirmed or removed from late and old structure. We included some stands not modeled as late and old structure within this structure category to develop a late and old structure spatial layer for designating connectivity. Finally, we applied forest plan standards for selecting areas of connectivity.

Spatial and Temporal Context

The spatial boundary for direct and indirect effects analysis includes National Forest System lands within Austin planning area. The spatial boundary for cumulative effects analysis includes National Forest System lands within adjacent Galena and Patrick projects and National Forest System lands within Middle Fork John Day River drainage. We included adjacent subwatersheds because connectivity corridors are required to connect to previously designated connectivity corridors within adjacent projects.

Unless otherwise noted, effect durations on wildlife are defined as follows:

[20] LiDAR: light detection and ranging (http://www.fs.usda.gov/research/treesearch/25534).

- Immediate: Approximately one growing season or less
- Short-term: 0 to 5 years
- Midterm: 5 to 25 years
- Long-term: Over 25 years

Proposed actions are unlikely to occur at the same time and implementation would occur incrementally over approximately 10 to 15 years. For example, commercial thinning treatments would not occur at the same time as prescribed fire or noncommercial treatments.

Potentially Affected Environment

Wildlife connectivity corridors have not yet been designated for Austin planning area.

There are currently 30 stands of old forest single-stratum (approximately 1 percent of Austin planning area) and 176 stands of old forest multi-strata (approximately 10 percent of the total planning area).

Table 21. Existing condition of acres and number of stands considered late and old structure within Austin planning area.

Structure	Acres	Number of Stands	Percent of Total Acres in Austin Planning Area
Old Forest Single-Stratum	1,020	30	1 percent
Old Forest Multi-Strata	7,550	176	10 percent
Total	8,570	206	11 percent

Environmental Impacts

No Action Alternative

Under the no action alternative, no management activities would occur, and Austin planning area would remain as-is within the potentially affected environment described above.

Proposed Action

Direct and Indirect Effects

Dispersal and permeability across the landscape for old forest habitat-dependent species is expected to occur within designated areas of connectivity, especially within connectivity that overlaps moist forest. Approximately 9,220 acres of connectivity are proposed to provide connections between late and old structure stands. Except for one replacement old growth stand in the northwest portion of the planning area (04369MMRO), we connected all dedicated and replacement old growth stands in at least two directions. We were unable to connect all late and old structure stands in at least two directions due to lack of appropriate cover and vegetation nearby.

Approximately 65 percent of late and old structure stands would be connected in at least two directions, 8 percent would be connected in one direction, and 19 percent would not be connected. See Evaluation of Proposed Forest Plan Amendments for more information.

Table 22. Number and acres of late and old structure stands we connected zero, one or two ways with connectivity corridors.

Ways Connected	Number of Stands	Acres
0	56	1,640
1	16	640
2	134	6,290

Forty one percent of designated connectivity corridors are proposed for commercial thinning. However, commercial thinning within connectivity corridors would have an increased basal area target of 60 square feet per acre, would retain large and old trees, and would leave approximately 15 percent of each unit in wildlife leave patches to meet connectivity standards as described in the proposed action.

Stream and floodplain and riparian meadow restoration treatments would follow the same specifications within the connectivity corridor as outside of it. These treatments are typically long, narrow units or small portions of connectivity and do not by themselves move the connectivity corridor below Malheur Forest Plan standards. Stream and floodplain restoration treatments would have leave areas ranging from 5 to 65 percent of treatment acres depending on the potential vegetation group (cold, dry, or moist upland forest). Reducing connectivity fragmentation in moist upland forest potential vegetation group would likely impact more wildlife species dependent on dense cover for nesting, foraging, or dispersal.

Some hazardous fuels treatments (approximately 868 acres) overlap connectivity corridors and target small trees up to 9 inches diameter at breast height in the planning area to reduce ladder fuels along wildland urban interface and either side of strategic roads. There would be no hazardous fuels treatments within 100 feet of category 1 stream channels. Adequate canopy cover would be retained through variable density thinning, incorporating leave patches, and retaining large trees in these treatments.

Table 23. Acres and percentage treated of connectivity corridors by treatment type.

Treatment Type	Acres of Connectivity Treated	Percentage of Connectivity Treated
Commercial	3,770	41
Noncommercial	1,450	16

Cumulative Effects

Proposed designated connectivity would connect adjacent connectivity corridor stands established in Galena and Patrick projects. Through designation of connectivity corridors within Austin planning area, designated corridors would span the entire length of Middle Fork John Day River drainage within the Forest, connecting old growth and late and old structure stands. In total, including Austin and previous projects, we would designate approximately 19 percent of Middle Fork John Day River drainage as connectivity corridor.

Large Tree Structure

Methodology

The Forest has consistently defined old forest stands as having 10 or more trees per acre of trees 21 inches or larger diameter at breast height. Although old forest stands provide many social and ecological benefits, they are not the only stands where large and old trees exist. Young forest

stands in most cases have some large and old trees within them at a rate less than 10 trees per acre. This analysis demonstrates the impact to large tree structure across young and old forest structural stages based on proposed treatments.

For the purpose of this analysis, large tree structure was considered to be trees 21 inches or larger diameter at breast height. Proposed treatments where trees greater than 21 inches diameter at breast height would be commercially removed were compared with current structural stages within the planning area to determine the level of effect to large tree structure directly after commercial removal occurs.

Spatial and Temporal Context

The spatial boundary used for direct and indirect effects includes National Forest System lands within Austin planning area boundary. We analyzed effects using modeled structure data for 2022 and compared it to proposed commercial removal of trees 21 inches or larger diameter at breast height. For discussion of longer-term effects of structure based on treatment, refer to the Structural Stages measure of the Issues Considered for Analysis section.

The spatial boundary used for the cumulative effects includes National Forest System lands within Middle Fork John Day River drainage. This includes Austin planning area in the headwaters of Middle Fork John Day River and continues downstream to the Big Mosquito project and the Forest boundary near Bear Creek and Big Creek.

Potentially Affected Environment

We used FSVeg Spatial Data Analyzer analysis to assign structural stages to all forested stands within the planning area. These structural stages are adapted from O'Hara et al. (1996) and defined in the Structural Stages measure of the Issues Considered for Analysis section.

Table 24. Existing number and proportion of acres of each structural stage within forested acres of Austin planning area.

Structure	Acres	Proportion of Planning Area (Percent)
Stand Initiation	1,650	2
Stem Exclusion	22,990	31
Understory Reinitiation	38,620	52
Old Forest Single-Stratum	4,060	5
Old Forest Multi-Strata	7,500	10

Currently, young forest comprises approximately 85 percent of forested stands within Austin planning area. Although 85 percent is classified as young forest, large and old trees are still present in these structural stages below the 10 trees per acre threshold.

Based on collected stand exam data, forested stands are estimated to contain an average of approximately 6 to 7 trees per acre larger than 21 inches diameter at breast height across the entire Austin planning area, and an average of approximately 4 trees per acre larger than 21 inches diameter at breast height in young forest stands.

Environmental Impacts

No Action Alternative

There are no effects of treatment on large tree structure for the no action alternative because there would be no mechanical treatment where trees 21 inches or larger diameter at breast height would be removed. This alternative would not meet the purpose and need of maintaining and improving diverse forest composition and stocking levels to promote landscape resiliency. This alternative would result in the farthest departure from historical range of variability on the landscape.

Proposed Action

Direct and Indirect Effects

This alternative proposes to commercially remove grand and Douglas-fir trees 21 inches or larger diameter at breast height when they do not exhibit old tree characteristics (as defined as being approximately 150 years old). All other tree species would be retained if they exhibit old tree characteristics or if they are 21 inches or larger diameter at breast height. This is consistent with the standard for scenario A within the interim wildlife standard 6(d)(2) of the Eastside Screens outside of late and old structure stands. The intent of this standard is to retain and increase late and old structure conditions while managing for the appropriate species composition and density for the Austin planning area.

The proposed action moves Austin planning area closer to desired conditions in the long-term for late and old structure, density, and species composition than the no action alternative.

The proposed action moves the planning area closer to historical range of variability for old forest structure and would have a higher proportion of old forest single-stratum stands in the dry upland forest potential vegetation group, where it is most appropriate. It would also have a lower proportion of dense stands and greater increase in proportion of early seral species across the planning area.

Old ponderosa pine and western larch are typically found within drier sites of mixed conifer stands. We would thin around these trees to help protect and promote them.

Old grand and Douglas-fir are typically found within topographical depressions and protected moist areas within mixed conifer stands (Johnston et al. 2016). We would retain these trees as well as trees within 30 feet of individual old trees within mixed conifer restoration units. This would provide for both open areas of large and old trees, as well as protection and recruitment of late seral species in the most appropriate topographical positions to provide for clumps with vertical heterogeneity for wildlife habitat. See the draft Austin silviculture prescription for more details of tree selection.

Proposed treatments that would allow removal of large grand and Douglas-fir include seed tree regeneration harvest; upland restoration commercial thinning within dry upland forest ponderosa pine and mixed conifer units; commercial removal from aspen stands, mountain mahogany units, riparian meadow restoration units, and outer riparian habitat conservation areas in stream and floodplain restoration units.

Approximately 80 percent of large tree removal would come from stands not classified as late and old structure, including approximately 50 percent within the understory reinitiation structural stage. The proportion of acres treated for each structural stage where trees larger than 21 inches

diameter at breast height would be commercially removed is consistent with the proportion of structural stages within the planning area.

Removal of large trees would not target late and old structure but instead be applied consistently across the planning area. We propose removal of young grand and Douglas-fir 21 inches or larger diameter at breast height to decrease average trees per acre greater than 21 inches diameter at breast height by less than one tree per acre across the entire planning area.

Table 25. Acres within each structural stage and proportion of treated acres where trees larger than 21 inches diameter at breast height would be commercially removed.

Structure	Acres	Proportion of Treated Acres (Percent)
Stand Initiation	60	0
Stem Exclusion	9,240	31
Understory Reinitiation	14,620	50
Old Forest Single-Stratum	1,700	6
Old Forest Multi-Strata	3,720	13

The proposed action would not remove trees that exhibit old tree characteristics (defined as approximately 150 years old or older) or any other species besides grand and Douglas-fir 21 inches or larger diameter at breast height. However, during thinning operations, trees along roads and at landings that are defined as hazard trees through the Occupational Health and Safety Administration must be felled to ensure worker safety.

Wherever possible, hazard trees would be felled and left on-site as down logs. Using tethered assist logging systems on steep slopes reduces the number of people and amount of time that would be working on foot during logging operations by shifting workload to predominantly being within equipment. This reduces worker exposure within units and potential hazards, reducing the number of trees that may need to be felled for safety purposes. Tethered logging also reduces need for tail hold trees.

Although this may affect large tree structure at the local level in some units, it is not anticipated that there would be a measurable effect to large tree structure across the planning area due to felling or removal of hazard trees. Anticipated impacts would be a general reduction in habitat availability in the short- to midterm for wildlife species that prefer later seral forests with more dense structure and a general increase in habitat availability for species which prefer mature early seral forests with less cover and lower stand densities.

Cumulative Effects

The proposed action includes approximately 29,340 acres of commercial removal. This would result in approximately 11 percent of the 271,000-acre Middle Fork John Day River drainage potentially being impacted by commercial removal of trees larger than 21 inches diameter at breast height. Although this alternative proposes removal of grand and Douglas-fir trees larger than 21 inches diameter at breast height, cumulative effects at the scale of Middle Fork John Day River drainage would average less than 1 tree per acre of removal. Suitable habitat and dispersal habitat for wildlife dependent on larger or denser tree structure in the planning area would remain in the planning area and Middle Fork John Day River drainage via connectivity corridors, old growth networks, and late and old structure throughout the landscape.

Summary of Effects to Wildlife

Upland restoration treatments would retain old and large trees as defined by the Malheur Forest Plan and best available science guidelines for identification (Van Pelt 2008, and Johnston and Lindsay 2022). Young grand and Douglas-fir trees 21 inches or larger diameter at breast height would be removed. No commercial removal would occur in dedicated or replacement old growth stands. Thirteen percent of total acres proposed for commercial treatment occur in old forest multi-strata, and approximately 6 percent of commercial treatments occur in old forest single-stratum.

Reducing large grand and Douglas-fir trees in mixed conifer forests could impact foraging habitat, structure, and future cavity nesting habitat for species dependent on large tree structure such as pileated woodpeckers and Pacific marten. Proposed treatments in late and old structure and old growth stands are intended to improve stand conditions by releasing growing space for larger and old trees and reducing fuel loadings.

Existing larger trees would remain to provide large late seral tree structure and potentially develop into snags and downed wood in the long-term. Vegetation treatments in dry upland forest would promote large early seral species such as ponderosa pine and western larch. No large ponderosa pine or western larch would be removed. Old forest single-stratum stands would increase 15 percent from existing condition in the long-term and the growth and longevity of early seral species is expected. The acceleration of old forest single-stratum forests would enhance habitat for species such as white-headed woodpeckers, but may fragment habitat for species such as pileated woodpeckers. Overall, large tree structure would be impacted in the planning area, but suitable habitat would remain in denser forest patches within old growth networks, connectivity, and late and old structure stands.

Snag Density

Methodology

To analyze snag habitat for cavity nesting birds, we applied the best-available science tool, DecAID Advisor (version 3.0) (Mellen-McLean et al. 2017), available for forests in Oregon and Washington. DecAID is an internet-based summary, synthesis, and "meta-analysis" of the best available science including published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience.

Results from DecAID included a distribution analysis that produced histograms to display and determined how close current conditions for dead wood on the landscape match "reference conditions," which represents historical conditions. This distribution analysis was used as historical range of variability analysis for these wildlife species requiring snags and based on different wildlife habitat types in the planning area. We then compared the distribution analysis results to the needs of woodpecker species using tolerance levels from DecAID. Tolerance levels represent different proportions of a species population and their habitat need, in this case density of snags.

The DecAID distribution analysis and maps were determined for three wildlife habitat types present in portions of Bridge Creek Middle-Fork John Day River including: (1) eastside mixed conifer forest East Cascades wildlife habitat type, and (2) montane mixed conifer forest wildlife habitat type. The (3) ponderosa pine Douglas-fir wildlife habitat type represented 9,469 acres (12 percent) of the watershed which did not meet minimum acres needed for an accurate analysis

(12,800 acres are needed); therefore, data from Bridge Creek Middle-Fork John Day River watershed was combined with same habitat type in adjacent Camp Creek-Middle Fork John Day River watershed (13,788) to reach minimum acres required, and the data was analyzed together by using weighted averages. While data was used from this adjacent watershed outside of the analysis area, combined results were assumed to apply to ponderosa pine Douglas-fir types within the planning area only. For this reason, the spatial analysis area remained within Austin planning area.

We did a second analysis using FSVeg Spatial Data Analyzer to model snag densities for 40 years post-treatment. Small snags included snags 10 to 20 inches diameter at breast height, and large snags included snags greater than 20 inches diameter at breast height. Modeled data applied proposed mechanical treatments and the first prescribed fire to stands and included background mortality, density-induced mortality, and mortality from management actions. Modeled data was separated by potential vegetation groups associated with stands in the planning area and then these were grouped into the most appropriate DecAID wildlife habitat types to allow for comparison to DecAID results.

Data from both DecAID and the FSVeg Spatial Data analyzer models were summarized below (For complete model datasets, see the Wildlife Report).

Finally, we assessed viability of management indicator species that rely on snags using results from the tool and models above and the historical range of variability concept. See Wildlife Report for detail.

Spatial and Temporal Context

The analysis area for snags included Bridge Creek Middle-Fork John Day River watershed (approximately 78,276 acres), which is equivalent to Austin planning area boundary.

Unless otherwise noted, duration of effects on the wildlife resource is as follows:

- Immediate: Approximately one growing season or less
- Short-term: 0 to 5 years
- Midterm: 5 to 25 years
- Long-term: Over 25 years

Proposed actions are unlikely to occur at the same time, and implementation would occur incrementally, over approximately 10 to 15 years. For example, commercial thinning treatments would not occur concurrently with prescribed fire or noncommercial treatments.

Potentially Affected Environment

Results of DecAID distribution analysis and tolerance levels for cavity nesting species are available in detail in the Wildlife Report.

Eastside Mixed Conifer Wildlife Habitat Type

Eastside mixed conifer forest East Cascades wildlife habitat type represents approximately 51 percent (40,085 acres) of the watershed and planning area.

This habitat type is deficit in large snag density classes above 2 snags per acre compared to reference conditions but is near or above reference conditions for small snag density classes

between 6 and 24 snags per acre. Lack of large snags within this habitat type is likely due to past harvest of large trees, fire suppression, firewood cutting, and personal-use log harvest. Distribution of large and small snag densities in this habitat type within this planning area is similar across the entire Forest for eastside mixed conifer type (Wales et al. 2011).

Montane Mixed Conifer

Montane mixed conifer forest wildlife habitat type represents approximately 30 percent (23,474 acres) of the watershed and planning area.

This habitat type is deficit in large snags in higher densities (snags per acre), suggesting that this habitat is limited at higher tolerance levels for species such as pileated woodpeckers. Small snag density classes are near or above reference conditions except for greater than 24 snags per acre. Current conditions are greater than or at reference conditions at 0 to 2 and 4 to 6 large snags per acre densities. This habitat is near or above reference conditions for small snag density classes (greater than 10 inches diameter at breast height), except for greater than 24 snags per acre, suggesting habitat is available for cavity excavators that prefer higher densities of smaller snags.

Ponderosa Pine Douglas-fir Wildlife Habitat Type

Ponderosa pine Douglas-fir wildlife habitat type represents approximately 12 percent (9,469 acres) of the watershed and planning area boundary. As it did not meet minimum acres needed for an accurate analysis (12,800 acres), data from this watershed and adjacent Camp Creek-Middle Fork John Day River watershed (13,788 acres) were analyzed together by using weighted averages.

Ponderosa pine Douglas-fir wildlife habitat type is near or at reference conditions for large snags for snag densities from 4 to 18 snags per acre when compared to reference conditions. However, approximately 84 percent of this habitat type has less than 2 large snags per acre even in reference conditions. This low density of large snags reflects an existing and historical deficit in large snags across this habitat type, which demonstrates the impacts of historical management practices that targeted large trees for removal.

This habitat type is near or above reference conditions for small snags from 4 to 24 snags per acre. This is likely providing habitat for most woodpecker species up to the 50 percent tolerance levels but may be limited in some areas for species like Williamson's sapsucker and pileated woodpeckers, which prefer higher densities of large and small snags.

Environmental Impacts

No Action Alternative

Since no management activities would occur, there would be no loss of existing snags or downed wood from implementation activities.

Snag densities would likely increase in the long-term without treatment as natural mortality would continue from existing high stand densities and risk of insect infestations and disease. These would all likely continue especially with fire suppression.

Mortality of pine and larch would occur due to moisture stress and overcrowding, as well as insect and disease infestation, and increase larger snag densities over time. Bark beetle outbreaks would be beneficial for foraging three-toed woodpeckers (if present) and black-backed woodpeckers. Downed wood densities would be expected to increase as existing snags fall.

Insect infestations would increase foraging habitat for primary cavity excavating birds and other insectivorous species. Thus, in the long-term, potential disease and insects would likely increase nesting and foraging habitat for primary cavity excavators. Existing and future cavity nesting habitat could be vulnerable to large-scale stand-replacing wildfire because of high stand densities.

Proposed Action

Direct and Indirect Effects

Large snag densities within eastside and montane mixed conifer wildlife habitat types would decline slightly (by less than 0.4 snags per acre) in the first 20 years with little to no change afterwards. Within ponderosa pine and Douglas-fir habitat types, there would be no change to large snag density until 30 years after treatment with a slight increase (less than 0.2 snags per acre) through 40 years post-treatment. However, such a slight increase after 40 years would not likely have any measurable effect to habitat for species associated with large snags. Large snag deficiencies would remain in the wildlife habitat types. Results of modeled snag densities are available in detail in the Wildlife Report.

There would be minor reductions in small snags immediately after treatments, followed by a minor increase in snag densities to just above existing levels 40 years post-treatment. These modeled changes in small snag densities are so slight (less than 1.5 snags per acre) that it would not likely have any measurable effect to wildlife associated with snags.

Because of the deficit in the planning area for large snags, incidental removal of large hazard trees from commercial and noncommercial operations may further reduce habitat for species dependent on larger snags. However, large snags, clumps of snags, and trees showing signs of decay and cavities would be retained through project design criteria and silviculture prescriptions. Though large snags would not be targeted for removal, incidental felling of large snags identified as hazards may occur.

Larger snags would likely be retained throughout units because silviculture prescriptions retain untreated patches in “skips” to mimic a mosaic caused by low- to mid-severity fires common during historical conditions. Retention of patches can range from 5 to 15 percent of a harvest unit (when at least 40 acres in size), with 15 percent proposed for treatments within connectivity corridors. In addition, leave-trees showing signs of decay and existing wildlife use (like existing cavities) at minimum of 1 tree per 5 acres would be retained. Patches with higher densities of snags would be a priority for leaving. Occasionally new snags would be created through accidental damage by heavy equipment to live trees.

There would be removal of lodgepole snags associated with commercial biomass or post and pole treatments specifically within upland restoration units. Proposed lodgepole pine harvests would most likely occur on a small scale and in smaller patches where lodgepole pine is present within other upland restoration treatment stands. To mitigate impacts to cavity nesters, approximately two snags per acre of the largest size class present would be retained across harvest units where lodgepole pine is being removed.

Impacts to snags from proposed prescribed fires would vary depending on burn intensity, season of burning, existing fuel loading, and weather. Prescribed burns on the Forest generally burn 50 to 80 percent of a burn unit in a mosaic pattern, with nearly all fine woody debris (0 to 3 inches diameter) consumed, followed by up to 50 percent consumption of coarse woody debris (greater

than 3 inches diameter). Some mortality of live trees may also occur which could contribute to snag recruitment in burn units Existing snags and downed wood may burn, especially in fall when conditions are hotter and drier while spring burns may retain larger trees, snags, and downed wood. The planning area would not be burned at one time, and proposed burn blocks are generally split into smaller units ranging from 500 to 1,000 acres.

Road maintenance activities on stored roads could increase motorized access to snags, increasing snag loss from fuelwood harvest and the number of snags deemed hazards for removal on roads previously not being driven. However, most large snags located away from roads would be left on the landscape to provide existing and future snag habitat.

Though there would be a deficit of large snags, higher quality snags would be distributed across Austin planning area in the long-term (40 plus years) due to the potential of:

1. Increased growth rates in treated stands and retention of "old trees" that would over time become snags.
2. Retention of skips and gaps, with priority to retain clumps of larger snags and wildlife trees with existing signs of use or decay.
3. Additional mortality from prescribed and potential wildfire, incidental damage of trees from equipment in treatment units and natural mortality.
4. Treatment in late and old structure stands and connectivity corridors that would promote large and old trees (which would become snags in the long-term).
5. Maintenance of management area 13 old growth network. This large proportion of old forest habitat would not have any biomass or proposed commercial thinning. Thus, this network would provide old forest habitat for species in the planning area. The existing old growth network has many large and old trees, snags, and some downed wood.
6. Retention of larger snags in riparian areas, regardless of proposed activity. While approximately one-third of riparian habitat conservation areas are proposed for stream or wet meadow restoration, this type of treatment would not remove any larger snags because of the ability of operators to focus felling on specific trees targeted for wood placement or felling into stream channels. Some smaller material in the floodplain, like lodgepole, may be removed to restore wet meadows, but this would likely not impact wildlife associated with larger snags.

Cumulative Effects

The following discussion focuses on past, ongoing, and reasonably foreseeable actions (see Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions) that may contribute beneficial or adverse effects and that overlap in space and time to cavity nesting species with territories in Austin planning area and adjacent projects. Adjacent watersheds with ongoing or proposed activities accounting for potential impacts to snag habitat and associated wildlife include Bridge-Creek Middle Fork John Day Watershed, Camp-Creek Middle Fork John Day River, Reynolds Creek John Day River, and North Fork Burnt River watersheds. Note that the final determination of impacts to Management Indicator Species viability is still made at the forest-planning level.

Past activities such as timber harvest, road construction associated with timber harvest, wildfire, fire suppression, and firewood cutting have impacted the quantity, quality, and distribution of dead wood habitats and primary cavity excavator populations dependent on these habitat features across the analysis area. These activities have created the existing condition of dead wood habitats.

Past, ongoing, and reasonably foreseeable actions associated with accelerated restoration vegetation projects adjacent to the planning area include the Galena and Patrick projects because these projects share boundaries with Austin planning area. These two projects have similar objectives to move current vegetation conditions towards the historical range of variability by reducing overstocked conditions, high fuel loading, and reducing risk of wildfire. Authorized activities include commercial and noncommercial thinning, prescribed burning, and aspen, riparian, and meadow restoration.

Potential adverse and beneficial effects from these projects would be the same as the direct effects section above. For example, implementation would likely have short-term adverse effects to cavity excavating species from disturbance and direct loss of snags. The greatest potential loss would be from removing snags identified as hazard trees during construction of landings for commercial harvest and fall prescribed burning. These impacts would be limited in scale and not likely to impact species viability because the scale of cumulative effects would only occur to individual wildlife that happen to have nests and home ranges overlapping Austin and either Galena or Patrick Project, and only when management activities occur within the same season.

Potential mid to long-term benefits from thinning overstocked stands to move old forest multi-strata towards old forest single-stratum habitat would increase and enhance habitat for species that use, or prefer, late old structure forest with single-stratum or more open forests, such as hairy, white-headed and Lewis's woodpecker, and northern flicker. Williamson's sapsucker and pileated could also benefit, as thinning could accelerate the development of large-diameter trees within younger structural stage stands and restore resilient old forest structure.

Thinning and creating more resilient stands could reduce stands' susceptibility to mortality from stress, insects, or fire. This could potentially produce even fewer snags than current conditions in the short- and midterm, resulting in further snag density departures from historical range of variability in that time frame. However, project design criteria and prescriptions for thinning are intended to retain snags that are not hazard trees, patches of untreated habitat, and an average of one wildlife tree per acre that shows signs of decay. This would retain patches of snags and green-tree replacements for future snags across thinning units.

Fuels reduction projects that reduce the risk of severe wildfires and insect outbreaks are likely creating a small negative trend across the forest in potential post-fire habitat preferred by certain species like black-backed and Lewis's woodpecker. However, several medium and large wildfires have occurred recently and over the last two decades across the Forest that have created areas of post-fire habitat and very likely resulted in a beneficial effect for cavity nesters that prefer that habitat type across these areas.

Prescribed fires proposed for Austin and ongoing in the Galena and Patrick projects are expected to create new snags and also remove existing snags, especially during fall burns that burn hotter during drier conditions. Prescribed fire within the watershed would likely help maintain existing

high density of small snags and historical range of variability in small snag habitat but is not expected to greatly increase large snag densities towards the historical range of variability.

Maintenance of the old growth network across the National Forest System and designation of connectivity would have a long-term benefit to many cavity nesters as this creates a substantial amount of suitable forage and nesting for species like pileated woodpeckers and Williamson's sapsuckers with a preference for larger trees. Commercial removal does not occur in dedicated old growth stands; therefore, this network would continue to provide large areas with greater natural tree mortality, larger snags, and downed wood. See Maintaining Connectivity Between All Late and Old Structure and Old Growth Stands.

Past, ongoing, and future firewood cutting permits on Malheur National Forest would continue to have adverse cumulative effects on species requiring snags and downed wood. Firewood and longer length commercial firewood cutting is greater in areas with higher road density since roads increase access to the forest and removal of snags. Firewood and longer length firewood removal would be highest within adjacent watersheds during and immediately after commercial harvest due to road conditions improved for timber haul. This may slowly subside to current levels over time where roads not as widely used begin to grow in. Many of the stored roads (roads assigned objective maintenance level 1) in adjacent watersheds have lack effective barriers and wildlife benefits from that road storage have not been realized.

Cumulative snag loss continues, contributing to a snag deficit across the analysis area. The amount of large snags targeted for firewood has been increasing. Before 2021, firewood permits were limited to 16 cords per household. In 2019, 8,356 cords were sold, which was similar to the amount sold over several years before that. However, since firewood and small personal-use log harvest permits became free in 2021 (limited to 8 cords per household), permits for almost 5,000 more cords of wood have been issued. Further, the Malheur National Forest implemented a new commercial firewood permit that allows the harvest and removal of any size snag at any length, with some restrictions on western larch on roughly the southern half of the Malheur National Forest.

Potential increases in firewood and small personal-use log harvests would likely decrease available nesting and roosting snag habitat. Although we cannot currently determine the distribution of firewood cutting on the Malheur National Forest, sustained firewood and personal use cutting at previous or potentially increased levels, combined with the removal of hazard trees from numerous projects across the Forest and lack of road storage implementation and effectiveness would likely add to the current snag deficit, especially of mid- to large snags across the Forest.

Livestock grazing does not directly impact snag and downed wood habitat. However, infrastructure (fencing and water developments) for livestock grazing across the Malheur National Forest has been increasing. Hundreds of miles of fencing occur across the Malheur National Forest with the addition of approximately 200 more miles of fencing authorized under the Malheur National Forest's 2014 Aquatics Restoration Decision across the northern half of the Malheur National Forest since 2016. Although the amount of snag loss associated with fencing has not been quantified, livestock permittees are allowed a maintenance buffer of 6 feet on either side of a fence.

With fences occurring throughout quality wildlife habitat including old growth stands, connectivity corridors, and riparian areas, snag loss associated with construction and maintenance of livestock fencing is likely contributing to the snag deficit. Snags commonly fall on fences, which usually results in maintenance that requires bucking up newly downed wood and removing it from the fence corridor, resulting in loss of quality downed wood habitat along these corridors.

Reasonably foreseeable projects authorized under the Malheur National Forest Aquatic Restoration Decision (see Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions, Table D-2) could have some additive beneficial effects to habitat for cavity nesters, with minimal temporary displacement to wildlife during implementation. Aquatic restoration actions that remove conifer trees in floodplains, tip trees, add large or coarse wood into streams, and promote hardwood shrubs, aspen, or cottonwoods in riparian habitat would likely improve and increase potential habitat for woodpeckers that use riparian areas or hardwood species in riparian areas. These include Lewis's woodpecker secondary habitat, Williamson's sapsucker, downy woodpeckers, and Northern flicker.

Overall, cumulative effects of snag loss in the short-term would not threaten the viability of dead and defective habitat-dependent species at the Malheur National Forest scale because of the substantial amount of the Forest left untreated, including management area 13 old growth network, portions of connectivity, and much of the riparian habitat conservation areas (only 30 to 35 percent are proposed for treatment in Austin). Untreated habitat is also well distributed across the Malheur National Forest, including wilderness areas and areas with steep slopes.

Post-fire habitat has also been distributed across the Forest from wildfires. As habitat shifts to better reflect conditions expected under the historical range of variability, a shift in vegetation composition favoring wildlife species preferring more open habitat (such as white-headed woodpeckers, hairy woodpecker, Lewis's woodpecker, northern flicker, and Williamson's sapsucker) could also be expected. Future projects planned would be consistent with Malheur Forest Plan standards and guidelines relating to management indicator species, including retaining large, old trees and snags (that are not a hazard) and ensuring maintenance of management area 13 old growth network and connectivity across the Forest.

It is important to note that snags and decadent habitat are likely decreasing at faster rates as we increase the pace and scale of treatments across the landscape and add infrastructure to the Forest. More treatment and infrastructure have resulted in more hazard tree removal and better mechanized access to snags from maintained roads and stored roads with no barrier. Although the viability of cavity excavating species at the Malheur National Forest scale is not threatened, there are likely population-level impacts due to loss of habitat and increase in risk factors (for example, improved motorized access, firewood cutting, and expanded firewood programs).

Economics

This section analyzes to what degree vegetation treatments, fuels treatments, and road relocations may impact employment, costs, and revenue in local economies.

Economic Efficiency

Methodology

Social and economic effects of proposed management activities were assessed in terms of viability of harvestable timber, employment supported, and income provided.

The computer program, TEA_ECON was used to estimate sale revenues based on estimated tentative advertised bid rates per hundred cubic feet of commercial acres for the proposed action. TEA_ECON is an economic analysis tool that allows the user to perform timber sale accounting at planning or sale layout level. The program uses price, cost data, and quarterly updated regional record of timber sale transactions to generate gross timber values, estimated advertised rates, and cash flow estimates.

These bid rates indicated economic viability of harvesting timber. Estimates of these bid rates were based on the following:

- Volume per acre was estimated from local knowledge of stands. All volume is in hundreds of cubic feet. Average commercial unit volume was estimated at 6.5 hundred cubic feet per acre.
- Species composition was estimated at 70 percent ponderosa pine and 30 percent Douglas-fir and other species for the sale as a whole.
- Estimated volumes of sawtimber are shown in Table 26.

In this project, cost effectiveness was measured in terms of present net value per acre. Present net value per acre equals present net revenues per acre minus present net costs per acre.

Measurable costs and benefits on commercial units were based on costs and revenue from timber volume proposed for harvest and described under assumptions for harvest viability. Preliminary value of timber removed is based on a weighted average for all sales actually sold within the planning area. Costs include logging systems, log haul, road maintenance, contracting, brush disposal, erosion control, and other development. These costs are shown in Table 26 and are discounted to present net values at a rate of 4 percent.

An initial tentative advertised sawtimber bid rate (in dollars per hundreds of cubic feet) was determined by subtracting costs associated with logging from base period prices adjusted for quality of material and current market conditions. This rate was reduced by 10 percent per current appraisal methods.

Transaction evidence appraisal method accounts for competition between bidders. It is important to note that advertised bid rates have fluctuated over the last few years, reflecting the volatility of the timber market. Prices would likely change in future (for example, when actual sale appraisal occurs) depending on market conditions at that time. Therefore, these estimates should only be considered rough approximations of future conditions. As a result, calculated bid rates were rounded to the nearest dollar. Timber sale revenues were also discounted to present values at a rate of 4 percent.

Base period price is the volume-weighted average bid price of competitively sold timber sales in the previous 4 quarters. This value is updated quarterly.

Spatial and Temporal Context

Although individuals and communities over a wide geographic area use national forest resources, residents and businesses of counties near the Forest depend most heavily on availability of resources. Consequently, effects of forest management on economic factors are strongest within these areas. Those counties most likely to be affected are listed under Potentially Affected Environment below.

The temporal boundary for analyzing direct, indirect, and cumulative effects to market values is the next 10 years because that is the span of time that it is likely to take to implement the project.

Potentially Affected Environment

The Forest primary zone of influence for economic impact of Austin is defined as Grant and Harney Counties in Oregon.

Environmental Impacts

No Action Alternative

Direct and Indirect Effects

Viability of Harvest

The no action alternative would not harvest timber and therefore would not affect harvest viability.

Employment and Income

This alternative would not harvest timber and therefore, would not support direct, indirect, and induced employment, or increased income to local economies. Lack of timber supply available for local mills to purchase has already adversely affected employment in local communities in Grant and Harney Counties (including Burns, Canyon City, John Day, Long Creek, Mt. Vernon, and Prairie City). Lack of timber supply available for purchase by regional mills outside the economic impact area would potentially affect employment in surrounding counties (including Baker, Ochoco, Umatilla, and Union).

Changes in the economic base and forest products infrastructure for the economic impact zone would continue to be influenced by fluctuations in market prices, international market conditions, changes in technology, and industry restructuring.

Economic Efficiency

The public would incur no costs from the no action alternative, nor realize any benefits of timber harvest in this area. No action would yield a present net value of 0 due to data limitations (described in the Methodology section) for quantifying economic benefits and costs beyond those identified at the project level.

This value ignores increased risks to forest health, vigor, and fire resistance that would result without implementation of this project and resulting losses in timber values and non-market benefits. Data limitations do not allow for quantification of this risk; however, this risk would negatively affect present net value. Ongoing costs associated with management of the area, including continuation of economic losses in forest stand values from recurring forest health problems, would continue.

Proposed Action

Direct and Indirect Effects

Viability of Harvest

TEA_ECON program was run for harvest viability. As shown in Table 26, the proposed action would produce approximately $3,412,809 in revenue, cost $1,058,944, and produce an estimated present net value of $2,353,866. This indicates that the proposed action would produce a viable harvest for the purchaser and present net value to the government could have a positive return. These numbers are all based on the predicted high bid of $9.13 per hundred cubic feet.

Employment and Income

In general, the primary effect on timber harvest-related employment would occur from commercial harvesting over the next 2 years. Financially viable sales would be necessary to provide opportunities for timber harvest-related employment.

Noncommercial activities would also provide jobs through contracting; this is not estimated in the employment estimates in Table 26.

Distribution of economic impacts would depend on location of the timber purchaser awarded contracts at time of sale, availability of equipment and skills in the economic impact zone, and location and availability of wood processing facilities and related infrastructure. Processors outside of northeastern Oregon could potentially bid on sales and distribute jobs and income beyond the region.

As Table 26 shows, the proposed action would generate $14,522,974 in direct, indirect, and induced local income.

Based on commercial volume harvested, the proposed action would support approximately 521 jobs, (both direct and indirect) over the 2-year period.

Economic Efficiency

Market benefits that could occur as a result of proposed activities include increases in forest productivity and value for the remaining trees by eliminating competitive stress and reducing risk of growth-limiting insect attack.

Externalized costs such as those resulting from damage to soils, losses in wildlife habitat, and mobilized sediment in local streams are not well-defined or measurable at the project level in terms that provide comparison of assigned dollar values. Other sections of Austin Draft Environmental Impact Statement discuss non-economic benefits to human and environmental resources for a relative comparison between alternatives.

Cumulative Effects

Viability of Harvest

Estimates for tentative advertised sawtimber bid rates are within range of rates experienced by Malheur, Umatilla, and Wallowa-Whitman National Forests within the previous two years. There are also residual effects from past timber sales within the subwatershed which would not have a detrimental effect on viability of harvest. These past actions are described in detail in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions.

Employment and Income

The proposed action would provide some potential short-term economic relief by using commercially thinned sawlogs. The amount of local economic activity would be determined by whether the purchaser is local or distant, which mill(s) local or distant get the lumber, and price for the lumber. These cumulative economic effects could cause beneficial "quality of life" social effects, especially when combined with other ongoing Forest Service timber sales within Grant and Harney Counties that are providing employment and income.

There are foreseeable projects in both counties in various stages of planning that may potentially add to the Forest's annual timber offerings for 2026 and beyond (for example, Upper Long Creek Project on Blue Mountain Ranger District, Upper Bear Lake on Prairie City Ranger District, and Boundary Project on Emigrant Creek Ranger District). These ongoing and foreseeable projects are expected to add cumulatively to employment and income of Grant and Harney Counties during the life of Austin Project.

Economic Efficiency

The economic efficiency of past, ongoing, or foreseeable activities would not affect, or be affected by, any effects that have not already been described.

Table 26. Economic analysis of proposed action.

Measure	Proposed Action
Timber Volume (hundred cubic feet)	125,400
Ground Based Harvest Acres	23,328
Tethered-Skyline Harvest Acres	4,007
Total Acres	27,335
Average Bid Price ($/hundred cubic feet)	9.13
Discounted Revenues ($)	1,058,944
Discounted Cost ($)	3,412,809
Present Net Value ($)	2,353,866
Forest Service Preparation and Administration Cost ($/hundred cubic feet)	24.27
Stump to Truck Cost ($/hundred cubic feet)	97.4
Log Haul Cost ($/hundred cubic feet)	33.24
Brush Disposal Cost ($)	376,200
Road Maintenance/Erosion Control Cost ($)	125,400
Temporary Roads (miles)	43
Direct Jobs	326
Indirect Jobs	195
Total Jobs	521
Direct Income ($)	9,074,997
Indirect and Induced Income ($)	5,448,277
Total Income ($)	14,522,974

Cost

This issue was developed based on public comments concerning costs of proposed road relocations compared to improving the road in its present location (for example, replacing culverts and road surfacing improvements).

Methodology

Spatial and Temporal Context

There is one road system within Austin planning area that would be influenced: National Forest System road 2622000 on Crawford Creek. Effects of this proposed relocation would exist on the landscape for the next 50 years or until management objectives in the area change and road access is reconsidered.

Cost estimates for the proposed road relocation versus improvements to the existing road were calculated using 2020 wage rates and based on initial conceptual project specifics. The scope of the project would be refined as more information becomes available through project development.

Potentially Affected Environment

This main road provides primary ingress and egress into Crawford Creek area. National Forest System road 2622000 travels along the valley bottom and impacts stream function and aquatic habitat by occupying the floodplain and reducing the stream's ability to migrate laterally throughout the floodplain. Two culverts identified as fish passage barriers, undersized or nearing the end of their life (degraded), are located within the proposed Crawford Creek road relocation. These culverts would require replacement.

In addition to road prism erosion into streams, higher maintenance costs are associated with culvert replacement where roads cross Crawford Creek. Currently, the culverts do not provide passage for aquatic organisms. Reasonably foreseeable habitat restoration projects planned for these locations (see Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions) are aimed at developing these streams into suitable fish habitat which would change passage needs at road-stream crossings.

Replacing culverts with round non-fish-passing structures costs approximately $20,000 dollars per culvert, while constructing aquatic organism passage structures costs approximately $150,000 dollars per structure. Long-term costs of drainage features required on these roads depend on future conditions of the stream, its habitat, and species living in the ecosystems.

Relocating these routes would change how ingress and egress would occur on the landscape while still providing access for public use and land management activities. Since relocated access into these parts of the Forest would be improved, sustained, and planned as a long-term investment, comparing the cost of the no action alternative and the proposed action provides a framework for evaluating this investment.

Environmental Impacts

No Action Alternative

Three culverts identified as fish passage barriers would remain on Crawford Creek and would need to be replaced with aquatic organism passage crossings. The result of taking no action is described in the Potentially Affected Environment section above.

Proposed Action

Direct, Indirect, and Cumulative Effects

The following table breaks out costs associated with Crawford Creek road relocation and associated work.

Table 27. Cost of Crawford Creek Road relocation.

Cost	Amount	Proposed Road Activity
$8,000	0.1 miles	New construction on one segment, average slope 20 to 40 percent
$5,000	2 acres	Clearing and grubbing existing roadbed
$5,000	1 mile	Recondition existing roadbed
$99,000	1.1 miles	Aggregate placement on new minimum road system road
$20,000	10 each	Ditch relief pipes or grade sags on all new minimum road system road. One feature every 0.1 miles
$25,000	1 mile	Decommissioning and removing roadbed
$150,000	1 each	Aquatic organism passage crossings

Visuals

This section describes scenery values and effects associated with Austin Project. Viewing scenery is one of the most popular recreation activities of visitors to the Forest (USDA Forest Service 2019b). Scenery is a primary public value and legacy within national forests, benefiting people through improved quality of life, recreational enjoyment, and tourism economics.

Visual resources are defined in the Malheur Forest Plan as: "the composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal that the unit may have for visitors." Managing visual resources is managing scenic views visitors expect within specific areas. Malheur Forest Plan specifies the desired level of management based on physical and sociological characteristics of a management area.

This analysis is framed by the following measures: scenic integrity, scenic stability, acres of steep slope logging within visual corridors, and acres of seed tree regeneration units within visual corridors.

Visual Corridors

Methodology

The analysis applies National Forest Scenery Management methodology in conjunction with Malheur Forest Plan direction (USDA Forest Service 1990) and guidance from U.S. Highway 26 and Oregon Highway 7 Visual Corridor Plans. This includes scenery sustainability concepts described in Landscape Aesthetics, A Handbook for Scenery Management, Agriculture Handbook 701 (USDA Forest Service 1995e), and Recommended Scenery Management System Refinements, Appendix J (USDA Forest Service 2007).

Scenic integrity is the degree to which the scenery is free from visible disturbances that detract from the natural and socially valued appearance, including disturbances because of human activities or extreme natural events inconsistent with the historic range of variability (USDA

Forest Service 2007). Integrity is used to manage the attributes of landscape character, vegetative pattern, form, line, color, texture, and scale.

Landscape character is the naturally established landscape pattern in a geographic area that makes each landscape identifiable or unique. It includes both visual and cultural values and consists of the combination of physical, biological, and cultural attributes that are valued by constituents.

Scenic integrity is measured through six graduated levels defined by "visual quality objectives" within the U.S. Forest Service Visual Management System, Agricultural Handbook 462 (USDA Forest Service 1974). These scenic integrity levels can be applied in two ways: (1) to describe a degree of existing scenic integrity or disturbance, or (2) to describe a minimum threshold for future integrity to be achieved. These levels and descriptors of how people perceive them are shown below.

Table 28. Scenic integrity as described by visual quality objectives.

Scenic Integrity Levels[21]	Description	Visual Quality Objectives[22]
Very High (Unaltered)	Refers to landscapes where the valued landscape character "is intact" with only minimal, if any, deviations. The existing landscape character and sense of place are expressed at the highest possible level.	Preservation
High (Appears Unaltered)	Refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and on such scale that they are not evident.	Retention
Moderate (Slightly Altered)	Refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.	Partial Retention
Low (Moderately Altered)	Refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed They should not only appear as valued character outside the landscape being viewed but compatible or complementary to the character within.	Modification

Scenic integrity is measured from sensitive viewpoints inventoried by the Malheur Forest Plan and supplemented by project-level analysis. These objectives were further refined with the Highway 26 Viewshed Corridor Plan (USDA Forest Service 2000) and the Highway 7 Viewshed Corridor Plan (USDA Forest Service 1995d). The project's thresholds for scenery disturbance apply only to views from these locations. These viewsheds are further divided into three distance zones as described in Table 29.

[21] Scenic integrity levels are established by the Scenery Management System.
[22] Visual quality objectives are established by Malheur Forest Plan.

Table 29. Viewing zones that apply to visual or scenery management.

Distance Zone	Description
Foreground	The portions of a view between the observer and up to 0.5 miles distance.
Middleground	The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly form the stand (approximately 0.5 to 4 miles)
Background	The visible terrain beyond the foreground and middleground where individual trees are not visible but blend into the total fabric of the stand (approximately 4 miles to the horizon)

Scenic stability is the degree to which the desired scenic character can be sustained through time and ecological progression (USDA Forest Service 1995e) using six levels from very high (where all attributes are sustainable) to no stability (where no dominant attributes are sustainable through time). Scenic stability recognizes the often subtle, incremental changes that can severely diminish or eliminate valued scenic character. It uses historical range of variability as a reference baseline for sustainability.

For Austin planning area, existing scenic stability analysis focuses on the scenery attribute of vegetation, addressing its ecosystem conditions. Scenic stability of other scenery attributes, such as landforms, rock features, and atmospheric clarity are not involved in this evaluation, since they will change relatively little over time, regardless of the ecosystem and human influences.

The Austin Project scenic stability evaluation addresses current ecosystem conditions and stresses identified by field observation, data on vegetation and fire history, and interdisciplinary input from silviculture and fuels specialists. Assessing scenic stability for vegetation is guided by methods described in Appendix J – Recommended Scenery Management System Refinements (USDA Forest Service 2007), a supplement to the U.S. Forest Service Scenery Management System to sustain socially valued scenery within an ecosystem stewardship context.

Scenic stability is defined at the following levels:

- Very High Stability – All dominant and minor scenery attributes of valued landscape character are present and are likely to be sustained.
- High Stability – All dominant scenery attributes of valued landscape character are present and are likely to be sustained. However, there may be scenery attribute conditions and ecosystem stressors that present a low risk to sustainability of dominant scenery attributes.
- Moderate Stability – Most dominant scenery attributes of valued landscape character are present and are likely to be sustained. A few attributes may have been lost or are in serious decline.
- Low Stability – Some dominant scenery attributes of valued scenic character are present and are likely to be sustained. Known scenery attribute conditions and ecosystem stressors may be seriously threatened or have already eliminated the others.
- Very Low Stability – Most dominant scenery attributes of valued scenic character are seriously threatened or absent due to their conditions and ecosystem stressors and are not

likely to be sustained. The few that remain may be moderately threatened but are likely to be sustained.

- No Stability – Dominant scenery attributes of valued scenic character are absent or seriously threatened by their conditions and ecosystem stressors. None are likely to be sustained except for relatively permanent attributes such as landforms.

Austin planning area's scenic values were inventoried using a variety of methods. These methods include driving through the planning area on major and minor roads, reviewing previous data gathered for various projects, and GIS data (for example, fire history, location of visual corridors, geologic information, general vegetation maps, and water resource locations). All sources of information gathered provide a more complete command of the visual landscape in the planning area.

The existing condition was used with descriptions of proposed activities to determine extent and duration of potential impacts on visual resources. Descriptions of silvicultural and fuels analyses were reviewed and used as a reference to determine degree of alteration to the characteristic landscape. GIS technology was used to analyze proposed activities regarding visual quality objectives assigned to the area. Visual quality objectives, distance zones, and visibility were determined for Austin planning area using the Forest's GIS data.

Spatial and Temporal Context

Spatial context was set by Austin planning area boundary. Direct and indirect effects analyses were determined using this spatial extent.

Temporal context of the analysis would include effects that could be short-term (1 to 5 years) or long-term (6 years or more).

Potentially Affected Environment

Visual Corridors

U.S. Highway 26 Corridor

Visual quality objectives for U.S. Highway 26 Visual Corridor are retention (high scenic integrity level) in foreground and partial retention (moderate scenic integrity level) in middleground. Management activities are permitted within foreground areas, but deviations must repeat form, line, color, texture, and pattern that is common to the landscape character of the area. Management activities within middleground areas are permitted, and results of the activities on the natural landscape can appear slightly altered to average viewers. Noticeable deviations must remain visually subordinate to the landscape character being viewed. All management activities would be conducted according to concepts of landscape ecology and scenic resource planning and meet visual quality objectives. Projects would blend with the natural terrain and avoid stark contrast with the surrounding landscape.

Oregon Highway 7 Corridor

Visual quality objectives for Oregon Highway 7 Visual Corridor are retention in foreground and partial retention in middleground.

Wilderness Loop Corridor

The visual quality objective for the Wilderness Loop Corridor middleground is partial retention.

County Road 20 Corridor

The visual quality objective for County Road 20 Visual Corridor foreground is partial retention.

Landscape Character

Austin planning area is located along approximately 13 miles of foreground on U.S. Highway 26 and approximately 7 miles of foreground on Oregon Highway 7.

The landscape character is dominated by two major scenery attributes: moderately steep, dissected mountain landforms and a largely continuous forest canopy of mixed conifer, ponderosa pine, western larch, and riparian hardwoods. Scenic accents include large ponderosa pine and larch trees, riparian areas along perennial streams, meadows, scablands, and craggy rock outcroppings.

In general, vegetative patterns vary from areas of predominantly highly textured mountains to coarsely textured mosaic openings in the forest canopy. Fall colors of western larch, quaking aspen, and riparian areas are highly scenic. Middle Fork of the John Day River, Bridge Creek, and other riparian areas add distinct variety in vegetation, fall colors, and presence of water on the landscape. Research shows that a diversity of scenery attributes supports a positive viewing experience for people traveling through or recreating and supports quality of life for residents (Ryan 2005).

Desired conditions for scenic character in Austin planning area would offer a more open and diverse forest canopy representative of historical ecosystem conditions, typically displaying more large conifers; wildfire-adapted species such as ponderosa pine and western larch; and more aspen groves and meadows interspersed within the planning area's existing conifer stands and riparian areas.

Presence of existing small and medium-sized trees would decrease, especially trees that crowd and weaken more attractive larger trees, meadows, and aspen. Small and moderate-sized irregularly shaped openings and meadows would be more frequent and often bounded by diverse, historical canopies including full-crowned, mature conifers and aspen trees. Lastly, reintroduction of wildfire is desired, primarily resulting in fine-scaled, irregularly shaped, and low to moderate intensity burn patterns that would better reflect historical conditions.

These scenic attributes would be distributed over the landscape to offer a more attractive character in terms of vegetative forms, colors, canopy texture, and immediate foreground spatial variety, while improving and restoring overall scenic character. These conditions would also increase ecological resilience and stability of vegetation scenery attributes that are central to the planning area's scenic character, image, and identity.

Scenic Integrity

Every landscape changes over time. Landscape vegetative character continues to change whether it is actively managed or allowed to evolve naturally. Vegetation management offers opportunities for both scenery and ecosystem improvement. There has been a change in historic vegetative species and patterns in Austin planning area. The changes are mainly attributed to past timber sales and fire exclusion. In much of the planning area, resulting patterns are becoming less sustainable over the long-term due to increasing risk of wildfire and disease outbreaks. These factors contribute to tree mortality and a degraded forest environment for recreation and viewing scenery.

Existing scenic integrity in Austin planning area meets visual quality objectives of Malheur Forest Plan and has a range of scenic integrity levels from high to moderate, although there is evidence of past activities. Partial removal treatments can be seen in partial retention areas and stumps are apparent. Areas of retention visual quality objective are intact. Scenic integrity levels meet Malheur Forest Plan standards and guidelines for natural-appearing foreground and middleground from scenic routes and developed recreation site viewsheds. There are areas of moderately to slightly altered scenic integrity in some middleground and background areas.

Scenic Stability

Currently, there are trends in the planning area indicating that scenic stability is in decline or rated low because the landscape has departed from historical reference conditions.

The predominant ecosystem stress influencing vegetation scenery attributes is nearly a century of wildfire exclusion. This stress has impaired many important scenery attributes (diverse, spacious, and fire-adapted forest canopies; large trees; meadows; and aspen) within widespread portions of the planning area. Continued stress would further impair and eliminate these socially valued scenery attributes.

There is increasing risk to forested areas by insect and disease epidemics and greater fuel loads increasing the risk of large stand-replacement wildfires. Sustainability of long-term scenery resources would continue to diminish. Natural processes associated with fire exclusion have played a role in the change in vegetation conditions and an increase in stand density. These conditions make it difficult to keep wildfire starts from expanding rapidly and burning intensely. These conditions pose a high risk of losing dominant scenic attributes such as open, park-like stands of ponderosa pine and minor scenic attributes such as aspen stands.

Because Austin planning area's major scenic attributes share a moderate risk based on their condition and ecosystem stress, scenic stability of the planning area correlates best with moderate and low scenic stability levels.

The Forest has standards and guidelines for scenic stability goals as developed in Forest Service Handbook 701. The goal is to move stability towards moderate level for the planning area where most dominant scenery attributes of valued landscape character are present and are likely to be sustained, but some attributes may have been in decline or lost.

The following scenic character goals would move ecosystem conditions toward an optimal and more sustainable desired scenic character.

- Retain and restore historical "ecologically established" vegetation scenery attributes by reducing vegetation density, increasing large tree prominence, vitality, and presence, and increasing overall vegetation diversity.
- Increase ecological resilience and scenic variety within the forest canopy by shifting vegetation and fuels conditions towards the planning area's ecologically established historical range. This would be achieved through wildfire cycle restoration and would result in more open canopies; improved spatial and species diversity; and an increase in larger and more fire-adapted trees.

Table 30 summarizes key visual features, distance zones, visual objectives, and acres present in Austin planning area. These are the areas that are addressed in visual and scenery effects analyses for Austin Project.

Table 30. Visual objectives and acres for each visual feature and distance zone.

Visual Features	Distance Zone	Visual Quality Objective (Scenic Integrity Level)	Acres in Austin Planning Area
Oregon Highway 7 and U.S. Highway 26 Visual Corridors	Foreground	Retention (High Scenic Integrity Level)	8,836
Oregon Highway 7 and U.S. Highway 26 Visual Corridors	Middleground	Partial Retention (Moderate Scenic Integrity Level)	24,689
County Road 20 Visual Corridor	Foreground	Partial Retention (Moderate Scenic Integrity Level)	80
Wilderness Loop Visual Corridor	Middleground	Partial Retention (Moderate Scenic Integrity Level)	34
Total	Foreground	Partial Retention (High Scenic Integrity Level)	8,836
Total	Foreground	Partial Retention (Moderate Scenic Integrity Level)	80
Total	Middleground	Partial Retention (Moderate Scenic Integrity Level)	24,723

Environmental Impacts

No Action Alternative

There would be no immediate direct effects to scenic integrity or stability from the no action alternative. This alternative would continue two current trends: (1) scenic disturbance reductions through vegetation regrowth, and (2) scenic impairment through increased tree density and loss of attractive species variety (forest stand spatial and structural diversity with large tree character and fire-adapted vegetation such as western larch and ponderosa pine) and impaired ecosystem resilience.

Scenic Integrity

The no action alternative would not produce any short-term visual disturbances or directly change the planning area's existing disturbances viewed from scenic visual corridors. Many existing scattered minor and moderate disturbances would be diminished through vegetative renewal over the next 10 years. However, potentially strong, and adverse indirect scenic disturbance effects could become increasingly more likely since declines in fire-adapted vegetation and ecological resiliency would continue in future decades throughout the planning area. In the event of an uncharacteristically large wildfire, many desirable elements of Austin planning area's scenery would be lost for an extended period.

Austin planning area's scenic integrity as viewed from sensitive viewpoints would continue to meet retention and partial retention levels.

Scenic Stability

The no action alternative would cause no immediate direct or indirect effects to existing conditions. Outcomes of the no action alternative are related to increasing stand density, encroachment of less resilient species, increasing fuel loads, and high levels of mortality. This

trend decreases overall resiliency of timber stands, causing scenic stability to decrease over time as conditions degrade.

Scenic stability effects are based on assumptions for continuing adverse vegetation conditions (overly dense, small sized, and uniform vegetation), resulting in continued low to moderate stability. This level of scenic stability would likely persist for decades unless there is an exceptionally large and severe canopy-consuming disturbance event (for example, insects, diseases, or wildfire), which might lower the planning area's vegetation-based scenic attributes to the no stability level.

Proposed Action

Direct and Indirect Effects

The proposed action would authorize silvicultural and fuels treatments (Table 31) and have short- and long-term effects to visual quality. Vegetation removal, management activities, and associated transportation changes would have a direct effect on landscape character and scenic integrity. There are two primary aspects that affect scenic quality: (1) vegetation treatments including logging systems (Table 32), and (2) fuels treatments including prescribed fire and surface fuels treatments.

Table 31. Acres of visual quality objectives by treatment type.

Vegetative Treatment	Retention	Partial Retention
Commercial/Noncommercial Thinning	3,382	13,045
Seed Tree	0	135
Aspen	100	52
Mountain Mahogany	3	399
Stream and Floodplain Restoration	245	725
Riparian Meadow	236	140
Hazardous Fuels	95	100
Prescribed Burning	8,836	24,797

Table 32. Acres of visual quality objective by logging system.

Logging Methods	Retention	Partial Retention
Tractor	2,956	12,061
Tractor/Skyline	35	273
Tractor/Tethered	27	1,255
Tractor/Skyline/Tethered	748	518
Skyline	0	4
Skyline/Tethered	58	149

Scenic integrity effects would result from changes to landscape character caused by implementation of vegetation management activities, ground disturbance, and vegetation removal from foreground and middleground areas of identified visual corridors.

Seed tree regeneration harvest would be used in 3 units directly adjacent to previous regeneration stands. The seed tree units are in the middleground of U.S. Highway 26 visual corridor. These units require amending Malheur Forest Plan management area 14 standard 19 (USDA Forest

Service 1990a page IV-109). Per Malheur Forest Plan, openings created for seed tree harvest would cease to be openings once trees in the stand reach a height of 20 feet in approximately 15 years.

Silvicultural and fuels treatments would remove understory trees to address uncharacteristic species composition, under-represented stand structures, and unsustainable tree densities. These treatments would decrease competition and increase growth rates in the residual stand while moving forests toward historical range of variability. Thinning would also decrease risk of uncharacteristic disturbance from insects, disease, and wildfire by promoting resistant species and increasing crown spacing.

Silviculture treatments would produce minor short-term scenery disturbances, including visible soil, color, canopy, and tree to plant contrasts such as stumps, skid trails, and landings. Treatments would improve scenic quality and stability over time.

Silviculture treatments, thinning and seed tree, would include ground-based harvesting, tractor logging, using various types of equipment depending on terrain and access constraints. Effects to visual resources from tractor logging would include visible evidence of slash on the ground, soil disturbance, and other types of evidence of where machinery is working. “Residual woody debris is one of the most significant predictors of negative perception of scenic beauty” (Ryan 2005).

Tractor logging would create some soil disturbance along skid trails, disturbing topsoil and exposing the soil profile. Understory vegetation would be disturbed along skid trails, which would be visible from an immediate foreground distance. Skid trails and landings for tractor logging may be noticeable to the average forest visitor. These visual effects are usually an immediate impact that dissipates within a short time; impacts are usually not visible after one growing season to the casual viewer.

Skyline and tethered logging systems allow for treatment of steep slope areas, including sections of highway corridors with retention visual quality objectives. A forest plan amendment to management area 14 standard 11 is proposed due to longer time needed for steep slope areas to meet their visual quality objectives after treatment. See Short-term Deviation from Visual Quality Objective Standard of Retention in the Proposed Malheur Forest Plan Amendments section and Evaluation of Proposed Forest Plan Amendments for more information.

Direct effects to visual resources from use of skyline and tethered logging include potential views into cable and tethered corridors from U.S. Highway 26 and Oregon Highway 7. The corridors could create an unnatural line void of vegetation that would be an apparent change from the surrounding canopy, resulting in short-term detrimental effects to scenic integrity in these areas. Long-term, scenic integrity would recover, and these treatments would increase scenic stability by reducing wildfire risk.

Fuels treatments are proposed to reduce project-generated and existing natural fuels. They are designed to reduce the risk of high intensity wildfire and resource damage by reducing ladder and ground fuels. Effects are primarily beneficial to visual quality, reducing visual impacts of human activities with a natural-appearing landscape. Removal or burning of residual material (tree stumps, snags, limbs, and brush piles) removes “clutter” that detracts from remaining trees or other scenic attributes. Research indicates that such forest canopy thinning and fuels reduction activities are more compatible with public scenery preferences for large trees, more open and

diverse canopy structures, less woody debris, and understory vegetation that softens effects of forest floor disturbances (Ryan 2005).

At the landscape scale, using prescribed fire in a timely manner and in phased treatments, it is expected to reduce future risk of a potential high intensity wildfire that would affect scenic quality. Fire intensities would be kept low during implementation to minimize fire and fire effects in overstory canopy. Fire would burn mainly surface fuels throughout prescribed fire units. Individual or small group torching may occur in areas where there are sufficient ladder fuels, and in timber stands with high occurrences of mistletoe-infected trees. There may be some minimal long-term effects such as small patches of overstory mortality; however, these patches are not expected to detract from landscape character.

With treatments scattered over a large landscape scale, direct effects to scenery would be minimal and short-term. A growing season would reduce effects to remaining scorched tree trunks and dead saplings. Fire at low intensity is a natural occurrence in this area and its effects do not degrade scenic quality. Prescribed burning can greatly improve a stand's resilience to large stand-replacing fire which can affect scenic stability. Prescribed burning would create scorched and blackened underbrush, saplings, bark, grasses, and forbs. Following the growing season, most effects would no longer be visible as fresh growth of forbs and shrubs would quickly sprout.

Vegetation treatments would restore plant communities, improve habitat diversity for fish and wildlife, enhance old growth stands, and improve forest health. After project completion, diversity of species, color, texture, and forms of these areas would be increased, improving scenic integrity. Proposed activities would have a secondary objective of meeting hazardous fuels reduction goals of creating a fire-resilient forest by reducing potential for large-scale, high intensity wildfires that threaten human life, property, and natural resources.

Ground-disturbing mechanical activities directly associated with proposed treatments would result in short-term effects to scenic integrity as previously described for silviculture treatments. All visual quality objectives would be met with implementation of these activities and associated project design criteria.

There are approximately five miles of temporary roads within retention visual quality objective areas and approximately 14 miles of temporary roads in partial retention visual quality objective areas. All proposed temporary roads would be rehabilitated and stored following use. With implementation of project design criteria, temporary roads would meet project visual quality objectives within the short term.

Scenic stability of Austin planning area depends on conditions that favor resiliency to disturbances. Currently, much of the area is outside historical range of variability in ways that put the Forest at greater risk of uncharacteristically severe wildfire. Under the proposed action, the planning area would receive treatments that enhance structural and species diversity, scenic character attributes, and resilience of the forest canopy. These enhancements would protect large trees and old forest characteristics, and promote future large tree character and structural and species diversity within existing overly dense stands and plantations.

Vegetation density within forest stands would decrease through proposed vegetative treatments that would create more attractive, open, and structurally diverse conditions, favoring historically dominant species such as western white pine, ponderosa pine, and western larch. These more

attractive, open, and diverse stand structure and species conditions would considerably reduce the risk of scenery-damaging ecosystem disturbances (insects, disease, and wildfire). Historically appropriate wildfire would better perpetuate Austin planning area's attractiveness and historically "natural" scenic character. Reductions in ecosystem threats to planning area vegetation scenery attributes would increase scenic stability level from low to moderate.

The proposed action would increase visibility into stands by removing trees in the foreground, enhance large tree character, open the mid-canopy, and create greater foreground diversity. This would result in a texture change to existing highly established textured patterns in dense forest stands resulting in a more varied pattern. Commercial thinning treatments would leave ponderosa pine and western larch species that have desired large tree character and greater fire resiliency. This effort would improve scenic character and stability in the area. Landscape character changes would be seen as a more open forested canopy character.

The proposed action would improve species composition and stand density, while reducing ladder fuels and canopy closure. Adherence to project design criteria (see Austin Appendix C – Project Design Criteria) would reduce short-term effects to scenic integrity and stability.

Cumulative Effects

Effects of past timber harvest and wildfire activities, in addition to ongoing activities, are accounted for in existing visual quality objectives and scenic stability levels of the planning area. Actions under the 2015 Invasive Plants Treatment Record of Decision are expected to improve grassland composition, restore areas, and cumulatively maintain visual quality and scenic stability (USDA Forest Service 2015c). In conjunction with Austin Project, reasonably foreseeable activities authorized under the Aquatic Restoration Decision would maintain or improve scenic integrity and stability of the landscape in affected areas.

Watershed Condition and Aquatic Habitat[23]

This analysis is framed by the following measures: water quality and channel shape and function. These measures are the relevant elements that speak to the relationship between the alternatives and the fisheries and water resources. Effects to water quality are indicated by anticipated change in 7-day average daily maximum stream temperature trend. Effects to channel shape and function are indicated by acres riparian habitat conservation area treated and miles of treated and untreated stream meeting or moving towards riparian management objectives based on six primary habitat indicators.

Methodology

Temperature was selected as a measure for water quality because stream segments in each of the six subwatersheds (12th field USGS Hydrologic Units) and a segment of Middle Fork John Day River are included on the 2022 Clean Water Act Section 303(d) List of Water Quality Impaired Waterbodies for temperature and do not fully support their designated beneficial use based on aquatic life. Current temperature rating and data are consistent with Oregon Department of Environmental Quality 303(d) listing (see table 50). The applicable temperature criteria are based on life history requirements of particular species or type and season of aquatic life use of the streams. This determination is made by Oregon Department of Environmental Quality and

[23] This description of watershed conditions affecting water quality is an update to the Upper Middle Fork John Day watershed Analysis Report (Malheur National Forest, December 1998) for core question 4 – Water Quality.

approved by U.S. Environmental Protection Agency, according to provisions of the Clean Water Act, and is based on recent monitoring (ODEQ 2022).

Water quality that supports designated beneficial uses is one parameter used to rate Watershed Condition Class under the Watershed Condition Framework (USDA Forest Service 2011), as directed by Forest Service Manual 2521.1. In addition, PACFISH[24] and INFISH[25] Biological Opinion Effectiveness Monitoring Program (under the Interagency Deputy Team) and the Forest Service Aquatics program measure water temperature partially to evaluate effects of land management activities on aquatic and riparian communities at multiple scales and to determine whether PACFISH management practices are effective in maintaining or improving structure and function of riparian and aquatic conditions.

Other perennial streams in the subwatershed assessment units likely do not meet state water quality standards for temperature, based on general stream condition descriptions in the Upper Middle Fork John Day River Ecosystem Analysis at the Watershed Scale (USDA Forest Service 1998b), routine monitoring, and ratings made under the Watershed Condition Class and Watershed Condition Framework programs. Generally, only perennial streams are flowing when temperature standards are least likely to be met, due to flow regimes and local climate. Perennial streams include both fish-bearing and non-fish-bearing streams.

In addition to temperature, we analyzed effects to channel shape and function by determining impacts on bank stability, fine sediment embeddedness, large wood, pool frequency, and width-to-depth ratio. Each of these habitat indicators plays a role in channel shape and function and acts as an indicator for habitat quality, and hydrologic and riparian function. Effects for each habitat indicator were determined using the following criteria: proximity, magnitude, intensity, and probability that the action may affect them; whether the action would have a positive, negative, or neutral effect; and whether it would be measurable or not measurable. Additionally, actions related to effects were further broken down by short-term or long-term.

For the planning area, we reviewed existing data for resources (for example, soils and riparian habitat) to determine existing resource conditions, which represents the best available data source at the time of this analysis. Malheur National Forest GIS layers provided spatial and tabular data.

Other sources of information considered for this analysis include field trips to perennial portions of fish-bearing streams within Austin planning area; Forest water temperature monitoring data; SunEye shade readings and GIS shade modeling; streamnet.org; NatureServe database; Oregon Natural Heritage Program database; Region 6 Regional Forester's special status species list (2015); and discussions with personnel from both Oregon Department of Fish and Wildlife and Confederated Tribes of Warm Springs Reservation of Oregon. Existing condition for potential fish-bearing streams that have not been surveyed was evaluated qualitatively based on principles of applied fisheries and watershed science, professional judgment, and knowledge of the area. The effects analysis for this project was developed in consideration of best available science and is consistent with the Malheur Forest Plan, as amended. This analysis includes consideration of John Day River Basin temperature total maximum daily load as determined by Oregon

[24] Interim Strategies for Managing Anadromous Fish producing Watersheds in Eastern Oregon and Washington, Idaho, and portions of California (PACFISH); USDA and USDI 1995.
[25] Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada (INFISH); USDA Forest Service 1995.

Department of Environmental Quality, which applies to all streams in the John Day River Basin, and impaired waterbodies as listed under Section 303(d) of the Clean Water Act.

Miles of stream that would be affected by proposed activities were determined using GIS information. Pacific northwest region stream survey reports provided existing condition data. These surveys were conducted across 16 streams within the planning area and totaled 61 miles surveyed, or approximately 86 percent of total fish-bearing streams within Austin planning area.

Fish species distribution was determined using Malheur National Forest and Oregon Department of Fish and Wildlife data. Redband trout (a Malheur Forest Plan management indicator species) were assumed to have similar habitat requirements to steelhead as they are genetically the same species. Columbia spotted frog were assumed to occupy all category 1 and 2 riparian habitat conservation areas. Where aquatic mollusks were not directly observed or documented through surveys or DNA, they were assumed to occupy all preferred habitat within the planning area.

Applying professional judgment based on knowledge and skills in combination with information from available data is the accepted approach for the watershed discipline because watershed science is not exact, and few data are available within the planning area. The common practice for watershed specialists, like other earth scientists, is to integrate available information with knowledge of basic principles of watershed science and physical and biological characteristics of the landscape. This results in a reasoned understanding of hydrological and soil processes, functions, and condition within Austin planning area.

Spatial and Temporal Context

There are a total of approximately 9,340 acres of riparian habitat conservation area in Austin planning area: 4,648 acres are in category 1 riparian habitat conservation areas (fish-bearing streams), 897 acres in category 2 riparian habitat conservation areas (perennial streams with no fish), and 3,795 acres in category 4 riparian habitat conservation areas (intermittent streams with no fish). Approximately 88 stream miles in the planning area are considered fish-bearing.

The spatial extent for direct effects for channel shape and function is treatment boundaries that intersect with known and potential habitats for threatened, Region 6 sensitive, and management indicator species (see tables 37 through 39). The spatial extent for indirect and cumulative effects is the subwatersheds that overlap Austin planning area including Bridge Creek, Clear Creek, Dry Fork Clear Creek, Mill Creek-Middle Fork John Day, Summit Creek, and Wiwaanaytt Creek (Austin Appendix B – Maps, Map 4). Effects from treatments within riparian habitat conservation areas are not expected to travel beyond these boundaries due to project design criteria that limit magnitude, probability, and extent of effects from proposed actions.

Table 33. Approximate miles of habitat for threatened and regionally sensitive aquatic species in Austin planning area.

Aquatic Species or Habitat	Miles of Habitat in the Planning Area
Middle Columbia River steelhead (critical habitat)*	49
Redband trout**	88
Columbia River bull trout (critical habitat)*	13
Western ridged mussel**	6
California floater**	6
Pacific lamprey**	1
Columbia spotted frog**	88

*Threatened
**Regionally Sensitive

Table 34. Approximate miles of Middle Columbia River steelhead critical habitat by stream within Austin planning area.

Stream Name	Miles Middle Columbia River Steelhead Critical Habitat
Bridge Creek	7
Clear Creek	10
Crawford Creek	6
Dry Fork Clear Creek	4
Fly Creek	Less than 1
Idaho Creek	2
Middle Fork John Day River	7
Mill Creek	1
North Fork Bridge Creek	1
North Fork Summit Creek	Less than 1
Summit Creek	5
Wiwaanaytt Creek	5
Total	49

Table 35. Approximate miles of Columbia River bull trout critical habitat by stream within Austin planning area.

Stream Name	Miles of Columbia River Bull Trout Critical Habitat
Clear Creek	13
Middle Fork John Day River	Less than 1
Total	13

The spatial context for water quality is Austin planning area perennial streams for direct and indirect effects. Streams flow through valleys that range most commonly from 100 to 200 feet in width. Valleys tend to narrow at higher elevations and widen, up to 400 feet, along segments of Middle Fork John Day River or in the vicinity of meadows.

Riparian habitat conservation areas extend across valleys onto adjacent hillslopes, above the toeslopes. Proposed activities are analyzed based on Oregon Department of Environmental Quality's water quality assessment units which include six subwatersheds, with their respective stream networks, and the Middle Fork John Day River segment. Activities proposed along streams; upstream, including in the vicinity of intermittent stream channels and ephemeral draws; and on hillslopes are evaluated to maintain consistency with Clean Water Act requirements.

Evaluating effects on the 303(d) listed Middle Fork John Day River segment is complex because of the pattern of ownership in Mill Creek subwatershed. Conditions on private and state land influence stream temperatures positively or negatively in Middle Fork John Day River as it leaves National Forest System lands. Therefore, cumulative effects are assessed where Middle Fork John Day River exits Austin planning area immediately below Bridge Creek as the culmination of all effects above that point and through the six subwatersheds.

Effects timeframes for direct, indirect, and cumulative effects vary by habitat type and response to disturbance variables such as proximity, probability, intensity, and magnitude. Temporal context of the analysis considers both short-term (1 to 5 years) and long-term (more than 5 years) scales. The temporal extent for effects ranges from immediately following implementation of some activities to several decades and is specified in the effects discussion.

Potentially Affected Environment

The potentially affected environment for water quality includes perennial streams or stream segments in those portions of the six subwatersheds that comprise the planning area and are managed by the Malheur National Forest. These include streams or stream segments that do not meet water temperature standards, are unlikely to meet them during the summer season when baseflow is low, or that are mapped as perennial streams in the National Hydrological Dataset. Note that stream classifications in the National Hydrological Dataset may not always match field conditions.

Water temperature is elevated in most perennial streams for reasons related to altered channel, floodplain, and valley condition and processes; encroachment by non-riparian plant species, primarily conifer trees; diminished shade resulting from past management activities implemented before development and application of Watershed Best Management Practices; and climate change.

Existing watershed conditions contribute to higher water temperatures by limiting or modifying groundwater exchange, storage and flow, or by increasing exposure to solar radiation. Water temperature influences metabolism, behavior, and health of fish and other aquatic organisms.

Middle Columbia River steelhead (Oncorhynchus mykiss) (threatened, management indicator species) and interior redband trout (Oncorhynchus mykiss gairdneri) (Region 6 sensitive, management indicator species) are documented to occur within the planning area in all streams listed in Table 33, although summer steelhead rearing habitat is limited throughout John Day basin due to high stream temperatures and poor instream conditions. Columbia River bull trout (Salvelinus confluentus) (threatened, management indicator species) are documented to occur within the planning area in all streams listed in Table 35. Western ridged mussel (Gonidea angulata) (Region 6 sensitive), California floater (Anodonta californiensis) (Region 6 sensitive), and Pacific lamprey (Entosphenus tridentatus) (Region 6 sensitive) may occur in Middle Fork

John Day River within the planning area. Columbia spotted frog (Rana luteiventris) (Region 6 sensitive) is considered present in all subwatersheds of the Forest and is known to occur within the analysis area.

Aquatic species without special management status documented within or downstream of the aquatic analysis area include Middle Columbia River spring Chinook salmon (Oncorhynchus tshawytscha). Nongame fish within the aquatic analysis area include northern pikeminnow (Ptychocheilus oregonensis), mountain whitefish (Prosopium williamsoni), sucker species (Catostomus macrocheilus or C. columbianus), speckled dace (Rhinichthys osculus), longnose dace (Rhinichthys cataractae), redside shiner (Richardsonius balteatus), and sculpin (Cottus spp.).

Lingering effects from historical features and practices are still apparent. Today, most streams within the planning area have roads or railroad grades paralleling them, have very limited large wood, and are not meeting riparian management objectives (see Table 36)[26]. This lack of wood likely contributes to or maintains poor conditions of riparian habitat. Large wood has a dominant influence on stream habitat and channel formation and when large wood is removed from a stream, a cascade of corresponding effects to other habitat elements can occur. Loss of wood can lead to sediment scour and channel incision (Gurnell et al. 2002). With this, there is often a corresponding loss of pools and decreased bank stability, which can lead to altered channel shape, as indicated by greater width-to-depth ratios, and changes to fine sediment and embeddedness. These stream channel adjustments often result in an increase in water temperature and overall reduction in fish abundance.

Table 36. Percentage of surveyed stream miles in Austin planning area meeting riparian management objectives as outlined in PACFISH and Malheur Forest Plan Amendment 29 with Region 6 habitat survey data.

Riparian Management Objective (Habitat Indicator)	Surveyed Streams Meeting Objectives (Percent)
Bank Stability	99
Fine Sediment Embeddedness	37
Large Wood	27
Pool Frequency	11
Stream Shade	52
Temperature	27
Width-to-Depth Ratio	14

Riparian meadow degradation is apparent in Crawford, Phipps, Summit, Taylor Flat (Mill Creek), and Wiwaanaytt meadows. These large meadows have historically been the “sponge” of the headwaters of the Middle Fork John Day River, capturing snowmelt for slow release through the spring and summer. However, these meadows are no longer functioning in that capacity. Because of historical features and practices previously described (see Watershed Condition section under Existing and Desired Future Condition), headwater meadows now have multiple

[26] The numerical objectives for these measures are found in Malheur Forest Plan (Amendment 29 or PACFISH). The state temperature standards are found in Oregon Administrative Rules.

incised channels with log and rock grade control structures that were installed in the past to arrest incision.

Snowmelt and precipitation are captured by the incised channels within the meadow and quickly funneled downstream and off the landscape. Because of this, water tables are not maintained throughout summer and streams downstream of the meadow often become intermittent. The resulting lowering of the water table within these meadows has allowed conifer encroachment, especially along their periphery, and changes to the type and vigor of riparian vegetation. These areas now have degraded riparian hardwood communities, reduced stream shade, and a loss of beaver habitat.

Environmental Impacts

No Action Alternative

Under this no action alternative, channel shape and function would largely remain the same. Large wood would not be added to streams and would only be recruited into streams through natural processes. Research suggests that restoring naturally recruited logjams may take over 100 years to develop (Collins and Montgomery 2002). Without addition of large wood, there would likely be no improvement to other habitat indicators. Stream temperature impairment would likely continue. However, there would be no short-term negative effects to habitat indicators from various ground disturbing activities in riparian habitat conservation areas. Under this scenario, recruitment of large wood, and the subsequent improvement in aquatic habitat in Austin planning area would not likely occur within the timeframe needed for recovery of listed steelhead.

Streams within the planning area would continue functioning in a degraded state except where reasonably foreseeable aquatic restoration actions would occur (see Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions). Restoration effectiveness would be limited where roads remain in proximity to streams. Recovery of localized areas due to changes in management would continue. However, degraded conditions related to altered sediment transport processes beyond the control of management would continue. In the long-term, while aquatic restoration activities authorized under the Aquatic Restoration Decision would improve riparian condition within Austin planning area, lack of treatment of uplands and riparian habitat conservation areas would not allow for more holistic watershed restoration. Road and crossing improvements related to haul and road relocation would not occur in this alternative, which would allow several miles of roads to continue acting as potential sediment sources, impeding and intercepting overland water flow; transporting sediment; confining and facilitating channel incision; lowering water tables and reducing riparian vigor; and impacting large wood recruitment.

Culverts that are nearing the end of their life and are partial fish passage barriers to juvenile salmonids would remain on the road system into the foreseeable future and be replaced gradually as funding becomes available. There would be no effects to fine sediment from temporary road construction for haul as no haul would occur under this alternative.

Severe crown fire is a potential effect of the no action alternative. If a severe crown fire occurs, shade would decrease, and water temperatures would increase. Sediment would increase from channel and upland sources and a pulse of woody debris would fall into the streams. Both low flows and peak flows would potentially increase until vegetation recovers. The threat of wildfire

within Austin planning area and its potential impacts on aquatic organisms would increase into the future.

The no action alternative may permit natural, slow, partial recovery from effects of past grazing, past riparian road construction, and past riparian harvest to the extent possible. This recovery would occur as riparian trees grow larger; large wood falls into streams; channel types change to more stable configurations; and riparian shrubs and sedges recover and contribute to more stable streambanks.

Recovery would be partial as ongoing impacts from past land management activities, land uses, and existing infrastructure (particularly riparian roads), meadow degradation, and the railroad grade would not permit full recovery, nor restore physical processes that facilitate recovery. In particular, railroad grades and roads in floodplains would affect stream recovery for 100 or more years due to impacts on floodplain connectivity. Floodplain connectivity greatly impacts long-term water storage which is crucial in the face of drought conditions.

Restoration described in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions, as proposed under the Aquatic Restoration Decision would likely be implemented (see table D-2). These projects include road-stream crossing upgrades (including removal of fish passage barriers when needed) and a wildlife exclosure around Phipps meadow. This exclosure is expected to reduce ungulate browsing of shrubs and allow for an increase in stream shade and corresponding decrease in stream temperature. Additional projects for fish passage upgrades are expected to cause a short-term increase in fine sediment and streambank instability, and a decrease in stream shade in the immediate area of work. These may add to adverse effects due to existing condition.

However, project design criteria for these actions include those identified in the Aquatic Restoration Biological Opinion (ARBO II) (USDI Fish and Wildlife Service 2013) and those within Malheur National Forest Aquatics Restoration Environmental Analysis (USDA Forest Service 2014a). Project design criteria would reduce the probability and magnitude of short-term negative effects. After approximately two years, effects of Crawford Creek road relocation and other road improvements associated with haul activities would be beneficial for water quality and habitat, including reduced sediment input from the road prism. Additionally, fish passage projects (including a bridge and various aquatic organism passage culverts) would improve hydrological connectivity and fish passage over the long-term as existing crossings have culverts that are failing or undersized. Overall, reasonably foreseeable aquatic habitat restoration activities (see Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions) are expected to have long-term beneficial impacts to aquatic habitat and fish even without implementation of potential Austin activities.

Proposed Action

Activities associated with upland vegetation management are proposed to extend into riparian habitat conservation areas. Approximately 45 percent of riparian habitat conservation area acres in Austin planning area would be noncommercially thinned through stream and floodplain treatment, riparian meadow treatments, and hazardous fuels treatment of strategic roads. Strategic road treatments would not occur within 100 feet of stream channels. Stream and floodplain treatments include inner riparian habitat conservation areas, the trees of which would

be retained and used in-stream to meet large wood riparian management objectives (see Austin Appendix B – Maps, Map 8).

Vegetation treatments and their distribution may affect shade; soil water; and ground water use, distribution, and movement. Other activities associated with vegetation treatment include skidding harvested trees from upland units through riparian habitat conservation areas to existing roads for haul, constructing and obliterating temporary roads to access upland units, and placing and removing temporary culverts.

Commercial removal from outer riparian habitat conservation areas would promote more characteristic fire behavior by reducing fuel loading and allow faster growth of remaining conifers into desired size classes for future wood recruitment on the floodplain. No old growth trees (greater than 150 years old) or trees greater than 21 inches diameter at breast height would be commercially harvested and large wood riparian management objectives would be met prior to or concurrently with any commercial removal from outer riparian habitat conservation areas. Impacts to future large wood recruitment are not anticipated because commercial tree removal would occur outside the primary wood recruitment zone (within 100 feet of the stream channel) and trees with old growth characteristics would be retained.

Stream and floodplain treatments would noncommercially thin approximately 2,450 acres (26.2 percent) of riparian habitat conservation areas in the planning area. These activities would occur adjacent to Middle Columbia River steelhead critical habitat for approximately 5.2 miles on Summit Creek, 1.5 miles on Idaho Creek, 7 miles on Dry Fork Clear Creek, and 2.5 miles on Crawford Creek. Noncommercial material would not be removed and would primarily be used for aquatic restoration activities. These treatments would occur within riparian habitat conservation areas over 24.5 stream miles (16 miles in category 1 riparian habitat conservation areas, 2.5 miles in category 2, and 6 miles in category 4).

Approximately 224 acres (4.7 percent) of riparian habitat conservation area acres in Austin planning area would be noncommercially or commercially thinned for riparian meadow restoration treatments. Riparian meadow restoration would occur along 5 miles of category 1 riparian habitat conservation area on Crawford, Summit, North Fork Summit, and Wiwaanaytt Creeks. Crawford and Summit Creeks represent the largest proportion of that distance with treatments primarily occurring within lodgepole-encroached headwater meadows and lower elevation meadows with incised channels. Approximately 47 acres over 0.5 stream mile would occur within category 2 riparian habitat conservation areas and approximately 167 acres over 1 mile would occur within category 4 riparian habitat conservation areas (See Austin Appendix B – Maps, Maps 11, 12, 15, and 16).

Hazardous fuels treatments along strategic roads would occur along Highway 26 and Highway 7 within the planning area and along the following roads that parallel riparian areas and or critical habitat for threatened Columbia River bull trout and Mid- Columbia River steelhead that do not have stream and floodplain treatments identified.

Table 37. Approximate miles of critical habitat within hazardous fuels treatment-only units by stream.

Stream Name	Road Number	Miles of Critical Habitat	Acres of noncommercial treatment within RHCA*	Species
Clear Creek	2635000	9	204	Bull trout, Mid-Columbia steelhead
Wiwaanaytt Creek	2645000	2.77	197	Mid-Columbia steelhead
Bridge Creek	Highway 26	5.65	170	Mid-Columbia steelhead

*RHCA = riparian habitat conservation area

Strategic road treatments are noncommercial and may overlap stream and floodplain treatments. Where this overlap occurs, stream and floodplain activities will cover strategic road noncommercial treatments and material will be utilized for aquatic restoration activities. Hazardous fuels treatments along Wiwaanaytt Creek (2.7 miles), Clear Creek (9 miles), and Bridge Creek (5.7 miles) do not overlap stream and floodplain treatments. Material from these treatments would be used for aquatic restoration activities when feasible including mechanized equipment (mastication) or having material piled (near road) or lopped and scattered. Hazardous fuels treatment units that overlap riparian habitat conservation areas and include no other treatments (stream and floodplain, riparian meadow, or winter shading) would exclude a buffer of 100 feet from the stream channels (project design criterion 106).

Table 38. Approximate acres of hazardous fuels treatment within riparian habitat conservation areas by stream type.

Stream Category	Acres of Riparian Habitat Conservation Area Treatment (includes 100-foot buffer)
Category 1	751
Category 2	10
Category 4	17
Total	778

Existing roads and proposed road activities have the potential to affect riparian function; aquatic habitat for threatened Middle Columbia River steelhead and bull trout; and management indicator species directly and indirectly. Roads affect riparian function because more sediment is contributed to streams from roads and road maintenance than by any other land management activity. Roads in proximity of streams are known to alter large wood recruitment, constrict floodplains, and lead to incision of stream channels. These effects result in reduced pool frequency, altered width-to-depth ratios, increased streambank instability, and inhibited riparian hardwood vegetation and shade, thus negatively impacting water temperature and fish habitat quality. Roads within floodplains have potential to negatively affect off-channel habitat and floodplain connectivity that directly influence juvenile salmonid rearing productivity. In Austin Project, approximately 50 miles of National Forest System roads are in valley bottoms or

immediately adjacent to toeslopes in proximity to the stream channel, affecting the ability of a stream to meander laterally through its floodplain. Roads in Austin planning area that occur within 100 feet of streams or that cross streams impact fish and fish habitat more than roads located in the uplands.

Road-stream crossings have impacted local stream channels and water quality. Some crossings were poorly designed with improperly sized culverts and misalignment relative to the natural stream channel. Other culverts have become fish passage barriers that limit distribution of fish. Stream crossings can provide direct input of sediment into streams, particularly on native surface roads that are improperly drained and create a "fire hose" effect amplifying stream energy. There are currently 124 stream crossings within Austin planning area; there are 22 native surface crossings within Middle Columbia River steelhead critical habitat in Austin planning area and 1 within bull trout critical habitat.

The mileage of native surface haul roads within 100 feet of streams are as follows: category 1 riparian habitat conservation areas (7.1 miles); category 2 riparian habitat conservation area (3.6 miles); and category 4 riparian habitat conservation area (10.7 miles). Native surface haul routes within 100 feet of Middle Columbia River steelhead critical habitat include 3.2 miles combined on the following streams: Summit Creek, Dry Fork Clear Creek, and Crawford Creek. These segments also include a portion of road identified for relocation on Crawford Creek.

There are 76 haul route stream crossings within category 1 riparian habitat conservation areas, 17 of which are native surface roads which cross Middle Columbia River steelhead critical habitat. These 17 native surface or gravel crossings are on Crawford Creek (9), Wiwaanaytt Creek (6), Summit Creek (1), and Dry Fork Clear Creek (1). There are 19 haul route crossings of category 2 streams, 14 of which are native surface roads. There are 85 haul route crossings on category 4 riparian habitat conservation areas, 55 of which are on native surface roads.

Most proposed temporary roads would have a discountable effect to aquatic resources due to their location outside of riparian habitat conservation areas; however, there are some proposed temporary roads within 100 feet of streams that could potentially affect aquatic habitat, particularly critical habitat. In Mill Creek-Middle Fork John Day River subwatershed, less than 0.1 miles of temporary road would be within 100 feet of Middle Columbia River steelhead habitat on Crawford Creek, split evenly between two sections of category 1 and 2 stream. A temporary road would be constructed off National Forest System road 2620210 and would cross a category 4 riparian habitat conservation area to connect to National Forest System road 1940000 along Summit Creek, a category 1 riparian habitat conservation area and Middle Columbia River steelhead critical habitat. This connection is within the outer 250 to 300 feet of riparian habitat conservation area and on the upslope side of the road. A study done on Malheur National Forest in 1999 found that under normal conditions, sediment was found no farther than 32 feet from road disturbance. The study concluded that buffer widths of 50 feet are sufficient to protect streams from sediment from existing roads under normal conditions. Conditions considered "not normal" in the study included (1) scabs (non-forested areas with shallow soils and limited ground cover), or (2) where runoff intercepts an abandoned road (McNeil 1999). Except for crossings, the majority of temporary roads in Austin planning area are greater than 50 feet from stream channels.

Table 39. Total miles of temporary road within 100 feet of stream by subwatershed (SWS) for category 1, 2, and 4 streams; category 1 and 2 stream critical habitat; and total number of category 4 skid-to-road sites.

Habitat Type	Bridge Creek SWS	Mill Creek Middle Fork John Day River	Summit Creek SWS	Clear Creek SWS	Dry Fork Clear Creek SWS	Wiwaanaytt Creek SWS	Total
Category 1	0	0.03	0	0	0	0.01	0.04
Category 2	0.11	0.06	0.02	0	0.01	0	0.2
Category 4	0.43	0.57	0.10	0	0.04	0	1.15
Steelhead Critical Habitat Category 1	0	0.03	0	0	0	0	0.03
Steelhead Critical Habitat Category 2	0	0.03	0	0	0	0	0.03
Skid-to-Road	2	7	7	0	3	4	23

*Critical habitat mileage is a subset of mileage calculated by stream type.

Crawford Creek road relocation would require new construction, reconstruction, and decommissioning of portions of currently open roads.

There are 34.9 miles of stored roads that would be used for haul. Approximately 0.3 miles of stored roads used for haul would be within 100 feet of the following category 1 streams: Crawford Creek (less than 0.1 miles), Dry Fork Clear Creek (0.2 miles), and Wiwaanaytt Creek (0.1 miles).

Table 40. Miles of stored roads to be used for haul within 100 feet of streams and critical habitat for Austin Project.

Stream/Habitat Type	Length (Miles)
Category 1	0.23
Category 4	0.45
Steelhead critical habitat	0.15

Approximately 2.1 miles of winter shading treatments are proposed on Bridge Creek within a category 1 riparian habitat conservation area and Middle Columbia River steelhead critical habitat. These units include tethered and tractor logging. Solar exposure modeling indicates a combination of topography and trees from north-facing slopes as well as trees between the stream and highway are creating shade on U.S. Highway 26. Commercial removal of byproduct no closer than 25 feet from Bridge Creek on north-facing slopes would occur on approximately 66 acres of category 1 riparian habitat conservation area and 35 acres of category 2 riparian habitat conservation area. Commercial byproduct removal would be variable due to topography (rock cliffs) and the Sumpter railroad grade which travels along the entire extent of Bridge Creek, resulting in patches that would remain untreated outside of the 25-foot stream buffer.

Watershed best management practices designed to control sediment and overland flow originating during common runoff events would be implemented as part of proposed ground-disturbing activities within riparian habitat conservation areas or on hillslopes. These activities would occur along Bridge, Clear, Dry Fork Clear, Mill, Summit, and Wiwaanaytt Creeks, and their tributaries in the six subwatersheds and along unnamed tributaries to Middle Fork John Day River in Mill Creek-Middle Fork John Day River subwatershed. Riparian meadow treatments expected to retain soil moisture and facilitate slow release of water to downstream channels are proposed in Dry Fork Clear, Summit, and Wiwaanaytt Creeks and Mill Creek – Middle Fork John Day River subwatersheds.

Direct and Indirect Effects

Research has shown that large wood is a particularly important habitat indicator to steelhead and other native fish. In 1996, the National Research Council stated that large woody debris may be the most important structural element to salmon habitat. It plays a vital role in many stream ecosystems through both physical and biological effects. Placement of trees (from the immediate riparian area and suitable upland areas) would facilitate recovery of hydrologic and geomorphic processes that: (1) create quality fish habitat, and (2) ensure continued maintenance of biological and physical processes associated with streams.

Large woody debris added to inner riparian habitat conservation area during proposed activities would contribute to restoration of both upland and riparian processes and functions. Over time, this would result in a positive effect on aquatic threatened, sensitive, and management indicator species in Austin analysis area. Longevity of this wood within the stream is variable, lasting from 10 to 30 years depending on decay rates, contact with moisture, size of tree, and tree species. Wood distribution to meet large wood riparian management objectives would be patchy in distribution.

Winter shading and hazardous fuels treatments on 5.7 miles total of Bridge Creek would reduce conifer shade and increase sunlight available for riparian hardwoods. These treatments would result in a loss of some trees that over time could have naturally fallen into Bridge Creek, however old growth trees and trees greater than 21 inches diameter at breast height would remain for future large wood recruitment. Future hazard tree felling would periodically augment wood recruitment to a level that is comparable to natural recruitment, resulting in a neutral long-term effect. Hazardous fuels treatments are generally composed of smaller material and would occur outside the wood recruitment zone, except in winter shading units.

Approximately 16.5 of 61 miles of fish-bearing streams (27 percent) are meeting large wood riparian management objectives. Upon implementation of Austin project, an additional 28 miles of stream would meet riparian management objectives for large wood, which would result in 72 percent of streams meeting large wood riparian management objectives in Austin planning area. There would be beneficial effects to many other habitat indicators from large wood placement, although response time for these indicators would vary.

Existing roads have directly altered natural sediment and hydrologic regime (timing, magnitude, duration, and spatial distribution of runoff flows) by changing sediment loading, transport, and deposition; channel morphology and stability; and water quality and riparian conditions within a watershed. A high percentage of roads in riparian habitat conservation areas in Austin planning area are native surface roads, which contribute fine sediment to streams and adversely affect

aquatic habitats. This has altered and degraded fish habitat through multiple pathways, resulting in incised channels (width-to-depth ratios), lack of pools (pool frequency), removal of large wood and future large wood, reduction in overall channel complexity, abandonment of side channels critical for juvenile rearing, reduction in stream shading, increased water temperatures, and overall conversion to more upland plant species which impact streambank stability. Only 37 percent of surveyed stream miles in Austin planning area are currently meeting the fine sediment and embeddedness riparian management objective of less than 20 percent.

Road crossings at streams are the primary mechanism for rainfall runoff intercepted by roads to enter stream channels and native surface crossings are more likely to contribute sediment to the stream system. Roads tend to concentrate runoff, resulting in higher peak flows than would occur without roads. Fine sediments from road surfaces also enter stream channels at road crossings, increasing turbidity, substrate embeddedness, and substrate composition. Adherence to rock crossing project design criteria, along with road improvements, would minimize impacts to water quality and stream habitat.

Road maintenance would have short-term positive effects (improvements), but long-term negative effects due to chronic disturbance in proximity of stream channels and enduring long-term effects on channel features such as width-to-depth ratio, pool frequency, and large wood recruitment. Number of stream crossings would remain the same for most of the planning area with the exception of removal of one crossing as part of Crawford Creek road relocation. Improvement in crossings would occur gradually as part of road maintenance for haul. Culverts that are failing or partial fish passage barriers would remain on the road network until replaced, resulting in negative effects.

Three roads within Austin planning area are located immediately adjacent to active stream channels and have been identified as negatively impacting floodplain connectivity, channel shape and function, shade, and large wood: National Forest System Road 1940000 adjacent to Summit Creek, National Forest System Road 2600000 adjacent to Crawford Creek, and National Forest System Road 7000449 (Taylor Flat) adjacent to the headwaters of Mill Creek. Of these three, only Crawford Creek (Middle Columbia River steelhead critical habitat) is proposed for relocation. There are 0.2 miles of new construction associated with Crawford Creek road relocation.

This new road construction would eliminate one failing road crossing within a wide valley floodplain section and relocate 0.9 miles of Crawford Creek Road in the floodplain to a decommissioned road up the toeslope. This action would eliminate one existing road crossing and fish barrier, improving fish access to approximately 3 miles of stream. New road construction proximity metrics for the proposed action are in Table 41 below.

A positive long-term effect to one or more habitat indicators is expected for Crawford Creek road relocation. These varied by long-term and short-term. Crawford Creek has stream portions that become intermittent during the dry months (August through September) partially due to roads in proximity of the stream and degraded headwater meadows. The riparian habitat conservation area is overstocked with young trees, the riparian meadow has encroaching conifers, and the stream channel has become incised or over-widened or both, compromising floodplain and channel function.

All of these cumulatively impact water storage and retention for slow release into the drier months, impacting perennial flow to some degree. Middle Columbia River steelhead become trapped within these intermittent sections of stream often resulting in mortality. Relocation of Crawford Creek Road (National Forest System Road 2620000) which alters floodplain connectivity and intercepts hillslope flow paths would have a limited positive effect on perennial streamflow.

Road relocation outside the wood recruitment zone would have a positive effect for large wood. Road relocation would also remove a road that constricts the stream channel and prevents floodplain activation, which would improve the habitat indicators of pool frequency, stream shade, width-to-depth ratio, and streambank stability. Constricted stream channels result in channel incision that lowers the water table and degrades the capability for water retention. This is particularly important for intermittent streams within Austin planning area.

Table 41. Miles of new road construction (associated with road relocation) within riparian habitat conservation area buffers and critical habitat (CH) within Crawford Creek.

Stream /Habitat Type	Length (Miles)
Category 1	0.20
Category 4	0.06
Steelhead CH Cat 1	0.20

*Critical habitat mileage is a subset of mileage calculated by stream type.

Road reconstruction would maintain motorized public access through the planning area, but farther from streams which would reduce overall road mileage within category 1 riparian habitat conservation areas and critical habitat. The area of relocation is within a wide valley section with a large potential floodplain that is currently limited by the road located within the floodplain. The majority of the Crawford creek drainage is confined to a narrow valley which is shared with the existing road. Portions of Crawford Creek become intermittent during summer low-flows, the wide valley section retains water during these periods.

Table 42. Miles of road construction (associated with Crawford Creek road relocation) within 100 feet of stream channel by road surface and stream type in Austin planning area.

Stream/Habitat Type by Road Surface	Length (Miles)
Cat 4 native surface	0.02
Cat 1 gravel	0.18
Cat 4 gravel	0.17

Decommissioning portions of a road associated with road relocation would reduce road mileage within Middle Columbia River steelhead critical habitat. This activity is only proposed in association with Crawford Creek road relocation with the goal to reconnect the stream with its floodplain. Although this portion of the proposed road relocation would have short-term negative effects for sediment and embeddedness in localized areas; these would be minimized by following best management practices and project design criteria (see Austin Appendix C – Project Design Criteria).

The proposed decommissioning and relocation of approximately one mile of road within category 1 steelhead critical habitat on Crawford Creek would have overall long-term beneficial effects within Austin planning area by reducing miles of road on streams, restoring floodplain

connectivity, and removing fine sediment sources within Crawford Creek long-term. Approximately 1 mile of gravel road decommission[27] would also occur within 100 feet of Crawford Creek as part of road relocation. Removal of this road would have short-term negative effects but would have a positive effect and long-term benefit for all aquatic habitat indicators.

Implementation of project design criteria to rock stream crossings would minimize potential sediment delivery to streams from haul activities. Effects to stream crossings from haul would be negative short-term for fine sediment and embeddedness, but not measurable.

Table 43. Number of haul-stream crossings within riparian habitat conservation areas and critical habitat (CH) for Austin planning area.

Stream/Habitat Type	Number of Stream Crossings
Cat 1	76
Cat 2	19
Cat 4	85
Steelhead CH Cat 1	6

*Critical habitat mileage is a subset of mileage calculated by stream type.

There are 34.9 miles of stored roads that would be opened for haul and then returned to storage. Approximately 0.3 miles of stored roads would be opened within 100 feet of the following category 1 streams: Crawford Creek (less than 0.1 miles), Dry Fork Clear Creek (0.2 miles), and Wiwaanaytt Creek (0.1 miles). Stored roads used for timber haul would be treated to promote self-maintenance after haul. Activities to promote self-maintenance include, but are not limited to, installation of earth berms, waterbars, and sediment barriers; blading side ditches; cleaning culverts and catch basins; and reshaping or rocking drain dips, grade sags, and cross ditches as necessary. All actions will be considered on a site-specific basis.

Table 44. Miles of stored roads proposed for haul within riparian habitat conservation area buffers, Middle Columbia steelhead critical habitat, and bull trout critical habitat for Austin planning area.

Stream/Habitat Type	Length (miles)	Miles of SH Critical Habitat	Miles of BT Critical Habitat
Cat 1	9.55	6.86	0.79
Cat 2	3.84	0.05	0
Cat 4	21.48	0	0

Table 45. Miles of stored roads proposed for haul within 100 feet of streams and critical habitat (CH) for Austin planning area.

Stream/Habitat Type	Length (miles)	Miles of Steelhead CH	Miles of Bull Trout CH
Cat 1	0.23	0.15	0
Cat 2	0	0	0
Cat 4	0.45	0	0

Use of stored roads for haul would be negative in the short-term for fine sediment and embeddedness due to ground disturbance and removal of vegetation on the roadbed. With proper

[27] There is no road decommissioning proposed in bull trout critical habitat.

implementation of best management practices and project design criteria, stored roads used for haul within riparian areas would not be measurable.

Short-term bank instability resulting from watershed and fisheries restoration would create rutted areas that channelize overland flow, generating fine sediment that enters the stream during project activities. In addition, operation of equipment within outer riparian habitat conservation areas for commercial byproduct removal and as part of noncommercial treatments within inner and outer riparian habitat conservation areas has the probability of generating sediment in the short-term prior to revegetation following activity. Compaction of soils as a result of multiple passes of heavy equipment may result in increased overland flow. Project design criteria for equipment use minimize these effects (see Austin Appendix C – Project Design Criteria).

The addition of large wood would help to reduce downstream flooding, dissipate stream energy, increase interactions between stream and groundwater, and improve sediment storage within the channel (Gurnell et al. 2002). Over time, this would help create more suitable spawning and rearing habitat, boost macroinvertebrate (fish food) production, provide hiding cover, and aid upstream migrations of anadromous fish (Opperman 2006). Branches of thinned or tipped trees would interact with stream and floodplain to capture sediment, increase sinuosity, and reduce gullying.

Negative effects to aquatic habitat for fine sediment and embeddedness would be meaningfully measurable in the short-term due to tethered logging up to 25 feet from Bridge Creek as part of winter shading treatments and hazardous fuels treatments within riparian habitat conservation areas as part of strategic roads treatments. However, watershed best management practices, standard operating procedures, and project design criteria are designed to control inputs of fine sediment and streambank instability, minimizing short-term negative effects on embeddedness and fine sediment.

As sediment is captured, the water table could rise, soaking in more water during snowmelt runoff and storing more water in the soil later into the summer, providing for expanded herbaceous and shrub communities. Large wood additions would help restore riparian processes and functions, enhancing floodplain roughness and stream channel complexity, including storage and sorting of stream substrates, resulting in a reduction in substrate embeddedness and fine sediment in the long-term.

Felling and tipping of trees as part of watershed and fisheries restoration within inner riparian habitat conservation areas would result in ground disturbance with localized streambank instability in the short term. Adding large wood to Bridge Creek as part of winter shading treatments would reestablish bank forming processes resulting in a long-term positive effect on bank stability in Bridge Creek.

Positive effects to pool frequency would be related to placement of whole and felled trees within the stream floodplain and channel. In-stream wood encourages multi-directional flow that creates pool-forming features that can increase pool frequency and complexity in the short and long term.

Removal of conifers encroaching within the floodplain would benefit existing riparian hardwoods and remaining conifers. Added wood also provides protection for newly sprouted shrubs and creates depositional environments that promote establishment of riparian hardwoods.

In-stream wood also dissipates stream energy, allowing sediment to settle into depositional bars and stable streambanks, which can reduce width-to-depth ratios.

Stream temperatures throughout the planning area may be affected directly or indirectly by the variety of activities proposed within riparian habitat conservation areas and on hillslopes. Reducing the amount and distribution of conifer vegetation throughout riparian habitat conservation areas may have a range of effects on stream temperature, especially in highly incised or otherwise highly altered stream channels and floodplains typical of the planning area. Effects of proposed vegetation treatments on shade, streamflow, and water temperatures are discussed in the following section and are based on existing data, professional judgement, and a reasoned application of hydrological and ecological principles.

Reducing conifer density, whether in openings or as part of variable density thinning, reduces streamside shade, but also increases available sunlight for riparian hardwoods. The number of trees tipped or felled to provide woody material is expected to be balanced by considerations for leaving trees for future woody recruitment, characteristic stocking of healthy stands, and old growth characteristics.

Shade reduction following creation of openings and variable density thinning in the primary shade zone is not expected to result in a measurable change in stream temperature. Shade in streamside openings is expected to be replaced as riparian hardwoods or other vegetation grows. Conifer vegetation would also be reduced within the wider riparian habitat conservation areas outside the primary shade zone either in openings or through variable density thinning. These reductions are unlikely to affect shade or stream temperature because shade produced from areas farther than 50 feet from streams would not typically fall on streams.

Water is the limiting growth factor on most hillslopes in Austin planning area. Increased availability of soil water after conifer removal retention would likely be transpired by remaining vegetation. Under some conditions, a portion of the water not used for transpiration may flow subsurface to and interact with floodplain and stream processes. Overall and over time, initial effects of increased soil and ground water are expected to diminish as the initial water available is likely to support more active conifer growth and transpiration in the inner, primary wood recruitment zone.

Increases in ground water capture, from either wood placement in streams or reductions in conifer transpiration, may persist and be great enough to affect conifer growth in narrow bands adjacent to wood placement or in local topographic lows where higher water tables may intersect the surface and provide saturated conditions unfavorable for most conifer growth. Floodplain, ground water, and stream channel interactions among these areas may contribute to reduced stream temperatures. Re-introduction of characteristic fire is likely to maintain these conditions. The expected trend is based on application of principles of physics and plant physiology; it is not expected to be measurable.

Watershed and fisheries restoration described in the proposed action would occur at selected sites along Bridge, Clear, Dry Fork Clear, Mill, Summit, and Wiwaanaytt Creeks, or their tributaries in the six subwatersheds and along unnamed tributaries to Middle Fork John Day River in Mill Creek-Middle Fork John Day River subwatershed. Effects of riparian meadow treatments proposed, where entrenched streams run through meadows and conifers have encroached on streambanks, are expected to be similar to those described above. Cutting conifers

may increase water availability and temporarily decrease shade. However, due to the abundance of sedge-like grasses in meadows, replacement shade that meets Malheur Forest Plan standard of 80 percent is expected to develop in two to three years. Woody material placed in channels is expected to slow high streamflow and promote overbank flooding, both of which would improve water temperature by enhancing shade from meadow vegetation, increasing water storage, and potentially extending seasonal water availability on the landscape.

Narrow openings in primary or secondary shade zones may occur during temporary road construction or from skid trails, depending on their proximity and that of their intersections with existing roads. Table 39 displays the number of instances of these activities in riparian habitat conservation areas along perennial streams by subwatershed. These openings are expected to be less than twenty feet wide; removal of shade, even on southern or western sides of perennial streams for that distance is not expected to measurably affect stream temperature. Replacement shade, from canopy expansion of adjacent trees or establishment of new trees, is expected to regrow within ten to thirty years following temporary road removal.

Skid crossings are limited to category 4 streams which are usually dry during the time when stream temperatures are a concern. Project design criteria would protect wetlands where they are present. Wetlands are likely connected to the stream network by subsurface flows at the time of year when stream temperatures are a concern. These connections would be protected by mats and are expected to maintain their contribution to subsurface cooling. Downstream water temperatures are not expected to increase measurably as a result.

Maintenance of roads in riparian habitat conservation areas is not expected to affect perennial stream temperatures. The proximity of roads to streams likely influences stream temperature negatively by intercepting subsurface flow and reducing the area from which shade and large wood may be recruited. Relocation of Crawford Creek Road out of riparian habitat conservation areas would increase shade and improve channel and subsurface flow conditions over time that would potentially contribute to cooler stream temperatures in the long-term. Effects of use and maintenance of roads which are not relocated would remain the same as at present.

Large, coarse, and small diameter wood for placement in streams would be selected from throughout the associated riparian habitat conservation areas as vegetation treatments are implemented. Vegetation treatments vary by location within riparian habitat conservation areas and may affect stream temperature in several ways. Placing conifers of different sizes strategically and at different elevations in stream channels is expected to improve channel conditions and channel-floodplain interactions. Placing large, coarse, and small diameter wood in stream channels is expected to re-initiate fluvial processes no longer functioning characteristically in highly altered streams.

In-channel wood may slow runoff, dissipate and redirect stream energy, and influence channel adjustment. These changes, in turn, initiate small geomorphic changes that are likely to promote sinuosity, as well as deposition and formation of inset floodplains, bars, and other stream bed features. These are early phases of stream channel recovery. These features are expected to capture, store, and process portions of spring and other runoff events for later release; delay floodplain drainage into channels; and extend the period or volume of storage. During periods of intermittently higher flows (for example, during runoff from wet convection storms), in-channel wood and associated bed features are expected to dissipate and redirect stream energy, altering stream channel-floodplain interactions and re-watering floodplain subsoils. Floodplain storage

would be increased or extended and promote increased flow during late summer. These processes may maintain or cool stream temperatures.

Areas of deposition would also likely provide nursery beds on which riparian vegetation, grass-like sedges, or riparian hardwoods would become established. These plants would provide additional shade along stream channels over the next three to ten years and enhance sediment capture and stream channel recovery. Alternatively, placing tipped and felled trees into channels may have little effect on current processes without implementation of other restoration activities, or effects may be delayed by a decade or more, depending on floodplain and channel conditions, such as degree of channel incision, floodplain depth, or sediment availability, transport, and deposition. Delayed or minimal effects on floodplain saturation may allow drier conditions to persist and conifer seedlings to become re-established until other conditions are restored over decades.

Relocation of National Forest System road 2620000 along Crawford Creek would primarily provide greater water storage potential in the channel, meadow, and floodplain once road segments are removed. Shade would likely increase as the removed roadbed becomes re-vegetated with sedges and similar plants in as few as two years, or with conifer or hardwood trees over two or more decades.

Stream reaches on Bridge Creek identified for winter shading treatments meet the riparian management objective for shade as part of the Pacific Northwest stream surveys within reach 2, but not reach 3. Riparian management objectives for shade based on forest type are 60 to 75 percent in a lodgepole pine ecosystem and 50 to 65 percent in a mixed conifer ecosystem. Reach 2 (lodgepole pine ecosystem) is currently 52 percent and reach 3 (mixed conifer ecosystem) is 40 percent. Sun eye shade data collection (11 samples) in the fall of 2022 within the proposed winter shading areas indicates stream shade ranges from 3 to 60 percent for July (with an average of 33 percent) and 7 to 79 percent for August (with an average of 46 percent).

Effects to stream shade from winter shading treatments may result in a short-term decrease in stream shade on patches of Bridge Creek due to tree removal between 25 and 50 feet from the stream as part of commercial byproduct removal. Survey data indicates primary shade is from alder adjacent to the stream and conifers from northern hillsides. The 25-foot buffer which provides primary shade in these reaches of Bridge Creek would remain intact along the north-facing slope. The 7-day average daily maximum for water temperature within this area is 18 degrees Celsius based on 2020 temperature data. Due to steep topography, the 25-foot buffer, shade from existing riparian hardwood community, and untreated areas, this loss of shade is not expected to measurably cause stream temperatures to increase.

Stream temperature within the planning area post-treatment would likely be similar to existing condition because upland treatment units are located too far away from Middle Fork John Day River to influence flow. Although proposed activities in riparian habitat conservation areas are expected to result in generally non-measurable changes in stream temperature, watershed restoration activities proposed in these areas may prime stream networks and associated floodplains and meadows for progressive improvement over time, and possibly at a faster rate, as watershed processes interact additively and synergistically, with and without lags. Improvement may occur over years to decades to centuries depending on which watershed processes are affected and how.

In summary, upland restoration activities would result in long-term positive effects to width-to-depth ratios and, potentially, to temperature. Watershed and fisheries restoration would result in positive effects to large wood (short and long-term), sediment (long-term), pool frequency (short and long-term), and width-to-depth ratio (long-term). Watershed and fisheries restoration would result in short-term negative effects to sediment and bank stability, though these effects would be minimized using best management practices and project design criteria.

Cumulative Effects

Analysis determined that meaningfully measurable effects to water quality and channel shape and function would result from project activities under upland restoration, watershed and fisheries restoration, and road activities. Activities that would not result in meaningfully measurable effects would not contribute to cumulative effects and will not be discussed further. Several reasonably foreseeable activities require that some of the activities in Austin proposed action be completed before they can be implemented.

For instance, planting hardwood shrubs is a foreseeable activity that would occur in openings created under the proposed action. Improvements in riparian condition and stream channel-floodplain connectivity expected to result from placement of large woody debris under the proposed action are expected to create conditions that would support implementation of foreseeable activities, such as future planting of riparian shrubs or filling of incised channels to reconnect floodplains.

Cumulative effects are mostly related to roads (including former railroads), past grazing, and past riparian harvest. Lesser effects may be due to current grazing, irrigation withdrawals (temperature), riparian firewood cutting (large woody debris), and fish passage and habitat restoration projects. Actions described in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions that have potential to impact watershed conditions include fish passage projects (Middle Fork John Day River bridge on Crawford Creek road and three culvert upgrades to meet aquatic organism passage requirements on Idaho and Summit Creeks), a wildlife exclosure on Phipps Meadow, irrigation withdrawals, firewood cutting, and additional fish passage and habitat restoration projects. The negative effects of past fish passage and habitat restoration projects would decrease after instream work is finished and would likely be negligible within 2 years after implementation.

Analysis of effects determined that road maintenance and haul (long-term), temporary roads (short-term), and road relocation (short-term) would have negative effects on embeddedness and fine sediment. Sediment production by haul road maintenance, road relocation, and stream crossing would be a small proportion of the total sediment from natural processes in addition to past and ongoing actions. This may result in increases in fine sediment resulting in a short-term meaningfully measurable negative effect for fine sediment and embeddedness due to the proximity of road maintenance along stream channels and magnitude of road maintenance activities within Austin planning area overall.

While project design criteria would limit sediment delivery to streams from these actions, it is probable that these short-term increases would result in cumulative negative effects when combined with other past, ongoing, or future actions for those streams that have roads parallel to them or have several stream crossings.

The cumulative effect of the proposed action would be a decrease in total sediment production from roads overall as a road would be relocated outside of a riparian area and improvements would be made to drainage features and existing crossings as part of general haul route maintenance. Floodplain connectivity would also improve in these areas in the short- and long-term as a result of this action combined with foreseeable aquatic restoration actions. See Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions. However, long-term effects to the indicators of pool frequency, large wood, width-to-depth, fine sediment and embeddedness, and stream shade would remain altering channel shape and function and limiting recovery where roads remain in proximity of streams.

Ongoing grazing activities could potentially contribute sediment to streams in the southern portion of Austin planning area; the northern portion allotment is vacant. Short-term increases in fine sediment from proposed road activities combined with grazing management activities are unlikely to reach a point where measurable adverse effects would occur if grazing standards are met. Current grazing standards are designed to not degrade aquatic habitat and riparian vegetation and eliminate effects on aquatic habitats that could carry over to the following year. It is unlikely that these effects would result in measurable adverse cumulative effects when considered with range management activities. Effects from grazing on other habitat indicators would be neutral or not meaningfully measurable.

Watershed and fisheries restoration and hazardous fuels treatments described in the proposed action, combined with reasonably foreseeable aquatic restoration actions, would partially restore riparian processes and functions that would result in a positive effect on aquatic threatened species habitat within the headwaters of Middle Fork John Day River. Slight increases in sediment and removal of trees from the wood recruitment zone in Bridge Creek are likely to result in cumulative adverse effects for fine sediment and embeddedness in the short term when combined with reasonably foreseeable aquatic restoration actions that would also have short-term negative effects on sediment. However, reasonably foreseeable aquatic actions combined with Austin proposed watershed and fisheries restoration would cumulatively result in a long-term decrease in total sediment production. Effects of foreseeable aquatic restoration on the remaining primary habitat indicators were either neutral or not meaningfully measurable.

Implementation of aquatic restoration projects listed as reasonably foreseeable in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions include activities that are expected to improve shade conditions and stream processes additively, synergistically, or independently of proposed actions. At a minimum, these changes would be expected to maintain water temperature along perennial streams in Summit Creek, Bridge Creek, and Mill Creek-Middle Fork John Day River subwatersheds, but may contribute to reduced stream temperatures as treatments reinforce proposed activities, mature over time, and become fully effective. For example, foreseeable activities would reinforce effects of placing large woody debris in stream channels. They would enhance development of in-channel hyporheic zones, floodplain interactions, groundwater storage, and sediment capture.

Processes that would promote shade or are expected to cool water by increasing groundwater storage would gradually improve in the following years to decades. Multi-year lags in temperature improvement are expected because multiple exposures to channel-forming events (annual to biennial high flows) and higher flows are required to initiate and maintain changes in hyporheic zone condition and floodplain saturation in the highly disturbed systems that exist in

the planning area. Portions of these activities are projected to occur following completion of actions proposed in riparian habitat conservation areas.

Reasonably foreseeable actions include reconnecting stream channels with floodplains, developing in-channel storage zones, and initiating recovery of other watershed processes. These actions are expected to become effective soon after implementation and gradually become more effective as projects mature. Cumulatively, stream and floodplain processes would gradually and synergistically become more effective at regulating stream temperatures over the following ten years as stream-wetland-floodplain corridors and complexes develop. Commercial byproduct removal for stream and floodplain treatments, winter shading treatments, strategic road fuel breaks, tethered logging, and skidding-to-road through riparian habitat conservation areas would result in ground disturbance within riparian habitat conservation areas, particularly on steeper slopes.

Project design criteria would minimize sediment, though short-term effects are anticipated to be negative and meaningfully measurable cumulatively with multiple activities using equipment proposed within riparian areas in proximity of stream channels. Effects of road actions were also found to be detrimental and meaningfully measurable for fine sediment and embeddedness in the short-term, and would be additive with reasonably foreseeable activities proposed within riparian habitat conservation areas.

Actions related to vegetation treatments and road maintenance within riparian habitat conservation area have been completed for Big Mosquito Project. However, aquatic restoration projects are ongoing. Camp Lick and Ragged Ruby Project vegetation treatments are ongoing. Cumulatively, these projects with Austin contain approximately 130.7 miles of Middle Columbia River steelhead critical habitat.

Within the Malheur National Forest, that is approximately 31 percent of the total Middle Columbia River steelhead critical habitat and 66.5 percent within the Middle Fork John Day River on National Forest System land, though it is a comparatively small percentage of all lands within the Middle Fork John Day River as a whole. Approximately 44 miles of bull trout critical habitat are located within these projects out of a total of 117 miles on Middle Fork John Day River. However, not all critical habitat within these project areas is currently being, or has previously been, impacted by these projects. Treatment areas within riparian habitat conservation areas related to road maintenance and silviculture actions represent a subset of total miles of habitat in these areas. Effects for these actions would be short-term and contained within the subwatershed in which they occur and would represent localized areas that cumulatively would not result in a significant portion of Middle Columbia River steelhead or their critical habitat being impacted at a given time when combined with past, ongoing, and reasonably foreseeable actions.

Stream and floodplain, riparian meadow treatments, aspen restoration, and fuels treatments would all contribute to restoration of both upland and riparian processes and functions. When combined with past, ongoing, and reasonably foreseeable actions, the proposed actions are expected to result in overall beneficial cumulative effects to aquatic species habitat. This project is consistent with Malheur Forest Plan and PACFISH objectives and is expected to move towards achieving those objectives in treated areas.

Short-term Uses and Long-term Productivity

Short-term uses are those that generally occur annually. Long-term productivity refers to the ability of the land to produce a continuous supply of a resource. Austin Project would result in short-term impacts but maintain long-term productivity of the area through use of specific Malheur Forest Plan standards and guidelines, features built into project design, and project design criteria. A description of impacts expected can be found in the above discussions. The project would result in a long-term yield of forest stands by reducing competition and improving growth of individual trees. The project would also result in an economic return from forest products produced and jobs created.

Unavoidable Adverse Effects

No unavoidable adverse effects over and above those addressed in the Malheur Forest Plan Final Environmental Impact Statement (chapter 4, pages IV-89) have been identified.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time, such as the temporary loss of timber productivity in forested areas that are kept clear for use as power line rights-of-way or roads.

The proposed action is not expected to create any impacts that would cause irreversible damage to soil productivity. The development and use of temporary roads and logging facilities is considered an irretrievable loss of soil productivity until their functions have been served and disturbed sites are returned to a productive capacity.

Evaluation of Proposed Forest Plan Amendments

As discussed in previous sections, the Forest Service has identified a need to change Malheur Forest Plan to better reflect current conditions and scientific understanding regarding necessary restoration of Austin planning area, and to more closely align with current agency direction and priorities. Based on direction provided in 36 Code of Federal Regulations 219, the responsible official must determine the appropriate scope and scale of Malheur Forest Plan amendments and apply those provisions of 36 Code of Federal Regulations 219.8 through 219.11 that directly apply to the proposed amendment[28]. In the following section, the provisions of 36 Code of Federal Regulations 219.8 through 219.11 that directly apply to the proposed amendments are briefly discussed.

Provisions of 36 Code of Federal Regulations 219.8 through 219.11 that are not directly applicable to proposed amendments can be found in the project record along with rationale for why those provisions are not directly applicable to the proposed amendments.

Management Area 13 (Old Growth) Changes

Based on the need for change, site-specific conditions in Austin planning area, and relevant Malheur National Forest-specific information and data, the following substantive requirements of 36 Code of Federal Regulations 219.8 through 219.11 apply to the proposed amendment to

[28] 36 Code of Federal Regulations §219.13 (2012).

modify boundaries of existing old growth stands and designate replacement old growth areas within Austin planning area.

The goals of management area 13 are to "Provide 'suitable' habitat for old growth-dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities" (USDA Forest Service 1990a, page IV-105) (36 Code of Federal Regulations §219.9(a)(1) and §219.9(a)(2)). Dedicated old growth is designed to provide habitat for pileated woodpecker, Pacific marten, and three-toed woodpecker, which are Malheur Forest Plan management indicator species (USDA Forest Service 1990a, pages IV-32 and IV-105) (36 Code of Federal Regulations §219.9(a)(2)(i)).

Replacement old growth is designed to provide replacement habitat for these species in the future. Although management area 13 is specifically designed to provide habitat for these three species, old forest structure and composition provides habitat for many other wildlife species as well. These species are commonly enjoyed and used by the public for trapping (Pacific marten) and observing (pileated woodpecker and three-toed woodpecker), as well as many other activities (36 Code of Federal Regulations §219.10(a)(5)).

Malheur Forest Plan provides direction to inventory and validate all old growth areas during project planning and correct previously dedicated old growth unit designations that are not meeting management requirements (USDA Forest Service 1990a, page IV-105, standard 4). This allows dedicated and replacement old growth to be designated to provide old forest structure for wildlife species dependent on that habitat across the landscape of the Forest through time (36 Code of Federal Regulations §219.8(a)(1)(ii)).

Validation of these management areas provides flexibility to move and designate dedicated old growth in areas where old growth forest structure and composition currently exist, and replacement old growth in areas where it would potentially exist in future. This promotes old forest structure and composition through time and allows planning to be responsive to changes in stand structure and composition in a dynamic landscape driven by stand succession, drought, wildfire, insect and disease activity, or other ecological processes (36 Code of Federal Regulations §219.8(a)(1)(iv) and §219.10(a)(8)). Changes to management area 13 boundaries could impact aesthetic values, fish and wildlife species, and habitat and habitat connectivity (36 Code of Federal Regulations § 219.10(a)(1)).

Direct and Indirect Effects

See the Wildlife Report for additional details on restoration activities proposed in management area 13 Old Growth network (not associated with this amendment), and analysis to management indicator wildlife species associated with old forest habitat.

No Action Alternative

Under this alternative, there would be no changes to management area 13 network in Austin planning area. A total of 7,281 acres would remain as management area 13. Some currently dedicated old growth and replacement stands would continue to not meet Malheur Forest Plan standards. Seven replacement or dedicated old growth stands would not have their boundaries modified to improve general old growth characteristics, such as large tree component and structural complexity. Four replacement areas or dedicated old growth stands would not be adjusted to contain continuous habitat but remain separated in several smaller, non-continuous stands. One replacement unit would not be expanded to meet Malheur Forest Plan standard's size

requirements. Two dedicated old growth units would not have a replacement old growth stand. However, many stands would remain in their current condition, providing aesthetic values in the form of maintaining stands of large trees viewable by the public.

Proposed Action

Proposed changes would include the following improvements to better meet Malheur Forest Plan standards: some stand boundaries would be changed to areas with more suitable old growth conditions that include a greater component of larger or older trees and more structural complexity; changes to boundaries to create a single continuous stand rather than smaller separated patches; relocation of some stands to more suitable areas with better old growth characteristics; and creating a replacement old growth area for those dedicated old growth units without one. See Table 46.

The proposed action would result in a total of 7,163 acres in management area 13, a net loss of 118 acres due to conversion of one dedicated old growth stand from a pileated woodpecker to a Pacific marten stand and a reduction in this old growth stand's size: the new proposed size would still meet Malheur Forest Plan requirements for a marten dedicated old growth stand (minimum of 160 acres). The proposed action would still meet Malheur Forest Plan standards and guidelines for old growth size and distribution within Austin planning area. The designation or expansion of suitable management area 13 areas across the planning area would improve the agency's ability to manage pileated woodpeckers, Pacific marten, and other late and old structure dependent species. It is anticipated that habitat viability for these species would be maintained or increased via the proposed management area 13 old growth network expansion.

Proposed changes to management area 13 old growth system in Austin planning area would contribute to the broader ecosystem integrity and diversity, both within the planning area and in the surrounding landscape, provided through management area 13, late and old structure, and wildlife connectivity corridors that connect them (consistent with 36 Code of Federal Regulations §219.8(a)(1)(ii), §219.9(a)(1), §219.9(a)(2), §219.9(a)(2)(i), and §219.10(a)(1)).

Management area 13 changes would provide old growth habitat and designate replacement old growth in areas that are on the path to becoming old growth habitat in future. Reviewing management area 13 old growth system and making these adjustments at project-planning level allows for management area 13 to be adjusted in response to system drivers (for example, ecological processes, disturbances, natural succession, wildland fire, invasive species, and climate change) (consistent with 36 Code of Federal Regulations §219.8(a)(1)(iv) and §219.10(a)(8)).

Changing management area 13 boundaries and locations under the proposed action would maintain habitat for old growth-dependent species (including Pacific marten and pileated woodpecker), which are commonly enjoyed by the public for trapping and observing (consistent with 36 Code of Federal Regulations §219.10(a)(1) and §219.10(a)(5)). In addition, management area 13 would provide aesthetic values in the form of maintaining stands of large trees viewable by the public (consistent with 36 Code of Federal Regulations §219.10(a)(1)).

Cumulative Effects

Cumulative effects of this proposed forest plan amendment are addressed at the Forest-scale. Malheur Forest Plan estimated 47,690 acres of dedicated old growth in management area 13 outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers

(USDA Forest Service 1990c, ROD-24). Since 1990, there have been 39 amendments that have affected the location and acreage of old growth areas. Of these amendments, 25 modified old growth boundaries, locations, or type. Twelve additional amendments increased management area 13 old growth by a total of 8,865 acres. Lastly, two were for woodpecker management (one for salvage harvest and another for commercial thinning).

Most non-fire related old growth replacements were minor relocations or adjustments to old growth area boundaries to better meet Malheur Forest Plan requirements for old growth habitat. With these 39 amendments, there are currently approximately 78,548 acres of management area 13 designation outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers. Additional old-growth habitat exists on the Forest in other management allocations that are distributed across the Forest.

The proposed action would result in a net loss of 118 acres of management area 13 due to the proposed change in one dedicated old growth stand and result in 7,163 total acres in the Austin planning area, and 78,430 acres of management area 13 across the Forest, outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers. (See Austin Appendix B – Maps, Maps 18 for proposed management area 13 locations, and Map 7 for existing management area 13 conditions).

Cliff Knox and Upper Bear Lake Projects also included this amendment and proposed 162 and 858 additional acres for management area 13 old growth, respectively. When Austin Project is combined with these two projects, the number of forest plan amendments to management area 13 would increase to 40 and the acres of mapped management area 13 would increase to 79,406 acres, or approximately 4.7 percent of the 1,700,000 acres the Forest allocated to the management area 13 designation.

Management area 13 changes would not alter multiple use goals and objectives for long-term land and resource management because changes in management areas would not alter the long-term relationship between goods and services projected by Malheur Forest Plan, nor would it forgo the opportunity to achieve an output in later years. Combined, management area changes are small in scale and there would be no changes to standards and guidelines for any management area due to these amendments. Malheur Forest Plan anticipated that changes in management area 13 would occur. Management area 13 standards 4 through 8 direct that dedicated old growth units that are not meeting management requirements be corrected; and that replacement old growth areas be provided to counter possible damage or deterioration of dedicated old growth in future.

Cumulative addition of management area 13 across the Forest with past amendments, this proposed amendment, and foreseeable projects would improve distribution, availability, and survivability of management area 13 old growth network across the Forest. This ensures that adequate old growth habitat is currently available and suitable for species that utilize or are obligates of late-seral habitat, and also assures that habitat is designated for management towards old growth conditions so that old growth conditions persist in the long-term.

Further, maintenance and expansion from some past projects of the management area 13 old growth network combined with connectivity corridors would allow dispersal and movement of old growth-dependent species across the Forest. This amendment, combined with similar past and foreseeable amendments would ultimately maintain the forest network of old growth habitat

to support or improve old growth management indicator species populations and provide more opportunities for those species to disperse across the landscape as specified in Malheur Forest Plan.

The proposed amendment meets the long-term goals of Malheur Forest Plan to provide "suitable" habitat for old growth-dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities.

Site Specificity

The Malheur Forest Plan, as amended, programmatically guides all natural resource management activities and establishes management standards and land allocations for the Malheur National Forest. This amendment under the Austin Project is a site-specific amendment following the Malheur Forest Plan's direction to inventory, validate, and correct all old growth areas utilizing an interdisciplinary process. Old growth areas across the Malheur National Forest have been inventoried and evaluated at the project planning level for the past 35 years following the current Malheur Forest Plan. This allows for site-specific analysis and response to changing conditions (for example, wildfire and stand deterioration) to designate management area 13 old growth where it currently exists for dedicated old growth areas and where it is on the path to developing into replacement old growth areas (dedicated old growth and replacement old growth areas may be shifted as needed throughout the life of the 1990 Malheur Forest Plan in response to changing conditions on the ground.

Table 46. Existing condition and proposed management area 13 (old growth) changes to meet Malheur Forest Plan standards. This table does not include units that have no proposed changes in management area 13. A full list can be found in the Wildlife Report.

Old Growth Management Area (MA13)	Minimum Acre Requirement MA13	Existing Acres	Proposed Changes and Rational	Proposed Action Acres
03237 Replacement Area (ROG)	80	147	Replaced original ROG with new ROG in a different location, still adjacent to DOG-0327. New location has more suitable old growth characteristics, including greater structural complexity and more larger trees.	146
DOG 03239 Pacific marten (MM)	160	167	Combined three smaller blocks of the original DOG into one continuous block with old growth characteristics.	192
03239 Replacement Area (ROG)	80	116	Relocated to more suitable stand with more old growth characteristics and near riparian area with larger trees and more structural complexity.	93
03241 Replacement Area (ROG)	80	62	Expanded stand boundary in south to meet size requirements for forest plan standards. Contains suitable old growth characteristics.	81
03335 Replacement Area (ROG)	150	178	Combined original two separate blocks into one continuous block with greater large tree component.	156
DOG 03336 Pileated Woodpecker and Pacific marten (PP)	300	315	Combined original two separate blocks into one continuous block and selected areas with more suitable old growth conditions.	302
03336 Replacement Area (ROG)	150	278	Combined original three separate blocks into one continuous block. Removed a small portion that did not meet old growth characteristics (this portion lacked old growth characteristics of larger trees and structural complexity).	169
04360 Replacement Area (ROG)	150	210	Original ROG consisted of two separate blocks far apart. Expanded boundary of the one original ROG block that was adjacent to the DOG and had suitable old growth characteristics. Removed the second ROG block that was over a mile away. This second block did not meet old growth characteristics in nearly half of the stand because it had been previously treated and lacked larger or old tree and structural complexity.	177

Old Growth Management Area (MA13)	Minimum Acre Requirement MA13	Existing Acres	Proposed Changes and Rational	Proposed Action Acres
DOG 04361 Pileated Woodpecker and Pacific marten (PP)	300	361 within project boundary (405 total)	Adjusted boundary to contain more suitable old growth characteristics. Note stand overlaps the Austin planning area boundary: both original stand and proposed stand have 45 acres outside of project boundary.	369 within project boundary (417 total)
04361 Replacement Area (ROG)	150	223	Adjusted boundary to contain more suitable old growth characteristics.	217
DOG 04365 Pacific marten (MM)	160	207	Adjusted boundary to include potential Pacific marten habitat and a Pacific marten detection.	220
04366 Replacement Area (ROG)	150	259	Selected new location closer to the DOG that also contains more suitable old growth characteristics with more structural complexity and larger trees. Original ROG was around 1 mile away with less suitable conditions.	240
DOG 04367 Pileated Woodpecker and Pacific marten Stand (PP): created from combining DOG 04367 Pacific marten (MM) with DOG 04372 Pacific marten (MM) and converted to PP type.	300	368	DOG 04367 PP type was made from combining DOG 04367 Pacific marten (MM) with DOG 04372 Pacific marten (MM) and converted to PP type. The conversion to a single larger pileated and Pacific marten type was to retain a similar size as original two smaller Pacific marten DOGs. The original location of 04367 MM was retained and enlarged to create the new location for DOG 04372. The original DOG 04372 was dropped because it lacked suitable habitat in large portions of the stand, was adjacent to the highway, narrow, and nearly 2 miles from its ROG.	300
04367 Replacement Area (ROG) (created from 04372 Replacement area)	150	245	Existing MA13 lacked a ROG for DOG 04367. Administrative change to convert name of ROG 04372 to 04367, in order to represent 04367 DOG. Original location of 04372 was kept: meets forest plan standards for size and old growth characteristics.	245
DOG 04369 Pacific Marten (MM): changed from Pileated	300	289	Reduced size of original DOG and converted to Pacific marten type (MM). This was due to a proposal to treat a narrow buffer along the highway to reduce shading and	183

Old Growth Management Area (MA13)	Minimum Acre Requirement MA13	Existing Acres	Proposed Changes and Rational	Proposed Action Acres
Woodpecker and Pacific marten (PP)			increase sunlight to highway. See analysis for more details and treatment details (Wildlife 156Report).	
04369 Replacement Area (ROG)	150	0	Exis206ting MA13 lacked a ROG. Created ROG adjacent to DOG 04369 with suitable old growth characterist221ics.	156
DOG 04370 Pacific marten (MM)	160	199	Expanded boundary to create more continuous block with old growth characteristics.	206
DOG 04371 Pileated Woodpecker and Pacific marten (PP)	300	458	Edited boundary to include more suitable old growth characteristics. Removed open patches on the edge that lacked old growth conditions and used portion of original stand to create replacement 04371.	301
04371 Replacement Area (ROG)	150	0	Existing MA13 lacked a ROG. New ROG created in area with suitable conditions for replacement for DOG 04371.	221

Reduction Satisfactory Cover below Malheur Forest Plan Standards in Big Game Summer Range

Based on the need for change, site-specific conditions in Austin Project planning area, and relevant forest-specific information and data, the following substantive requirements of 36 CFR 219.8 through 219.11 apply to the proposed amendments to reduce summer range satisfactory cover in the Wiwaanaytt Creek subwatershed below Malheur Forest Plan and Middle Fork John Day River standard of 12 percent.

This amendment is being proposed to authorize proposed commercial, noncommercial, and biomass treatments to enhance cold and dry upland forest stands, while still providing patches of horizontal cover from skips and gaps left during harvest operations.

The combination of past practices such as timber harvest and fire suppression have gradually converted dry pine and mixed conifer forests in Wiwaanaytt Creek, as well as the rest of Austin planning area, from primarily long-lived, early seral species (ponderosa pine and western larch) to a higher proportion of late seral species (grand fir and Douglas-fir) (Johnston 2017, Johnston et al. 2018).

Stand structures in the planning area currently do not reflect desired conditions based on historical references (Countryman and Justice 2010). Frequent low-severity fire regimes historically maintained ponderosa pine and western larch as the dominant species in both dry pine and mixed conifer stands (Johnston et al. 2018). Grand fir and Douglas-fir historically were not a major component within dry forest types, but were present on the landscape, primarily on northern slopes and topographic depressions with higher availability of moisture (Johnston et al. 2016).

The ingrowth of younger grand fir and Douglas-fir trees has also substantially increased stand densities and multi-layered canopies that have increased the risk of tree mortality to old ponderosa pine and western larch due to competition induced drought stress, insects and disease, and uncharacteristic wildfire. Both dry pine and mixed conifer forests are considerably denser and have much higher basal area today than they did historically (Johnston et al. 2018)) (§219.8(a)(1)(iv) and §219.10(a)(8)).

A forest plan amendment to reduce satisfactory cover in Wiwaanaytt Creek subwatershed summer range is needed to authorize proposed silviculture thinning treatments including commercial, noncommercial, and biomass treatments. These proposed treatments are designed to help move Wiwaanaytt Creek subwatershed toward historical range of variability given the historical fire regime (addressing substantive provisions § 219.8(a)(1)(iv) and § 219.10(a)(8)).

Thinning is designed to reduce tree density, retain old tree structure, create openings, and leave dense forested patches where appropriate to increase diversity and overall resiliency of the subwatershed to disturbance processes and potential future climate change (§ 219.9(a)(1) and § 219.9(a)(2)). Fuels reduction treatments are designed to reduce current fuel loads and create conditions where fire can be safely re-introduced into the landscape to help restore the fire-adapted system (§ 219.8(a)(1)(v)).

While forage is one important component of elk habitat, the most consistent variable in determining elk distribution is disturbance from motorized road use (Rowland et al. 2004). Under this project, there is no proposed road storage, and no new barriers would be constructed on existing stored roads. Stored roads with existing barriers that are utilized for haul would have

their barriers replaced post-haul. While proposed vegetation treatments would increase forage quality and quantity, they would also reduce cover. This reduction in cover combined with high open road densities in some subwatersheds and minimal elk security means that increased forage alone is unlikely to retain elk on public lands.

Direct and Indirect Effects

No Action Alternative

With no action occurring, satisfactory cover would be maintained in Wiwaanaytt Creek subwatershed. However, in the mid to long-term, distribution and type of cover may shift and change as natural mortality occurs within small patches of stands from insect, disease, or wildfire events. Without any treatments, there would be no thinning or prescribed fire, and current high tree stocking would continue to increase. Late and old structure stands would continue to develop and retain quality cover over time (assuming fire-suppression). Stands with higher tree densities would likely experience varying levels of natural tree mortality from insects or disease, and over-stocked conditions would continue to increase risk for stand-replacing wildfires.

A high-severity stand-replacing wildfire would convert stands in the late and old structure stage with currently high cover into stand initiation stage with very low to no cover, but higher forage. Within any stands that experience a wildfire or high insect and disease, habitat effectiveness index values may fall below Malheur Forest Plan standards for cover if the impact covered a large portion of a single subwatershed (see Table 49 and Table 50). While a largescale wildfire would suddenly remove large areas of cover, high quality forage would be expected to develop within the short-term. In the mid to long-term, regeneration of trees and shrubs would occur and begin to re-establish areas with new cover.

Proposed Action

Summer range in Wiwaanaytt Creek subwatershed would decrease in the short- to midterm with proposed thinning treatments. Historically, this subwatershed and Austin planning area had low- to mixed-severity wildfires more frequently that maintained a mosaic of areas with more forage and less cover for big game. There would have also historically been less disturbance from roads and associated motorized use, and less competition for forage with livestock. Proposed cover amendments would allow thinning and prescribed burning that would restore fire-adapted ecosystems in the planning area (consistent with 36 CFR § 219.8(a)(1)(iv), § 219.8(a)(1)(v), and § 219.10(a)(8)).

Total cover in Wiwaanaytt Creek subwatershed would be reduced to 20 percent, the minimum allowable under Malheur Forest Plan. While satisfactory cover would decrease in the short- to midterm, total and marginal cover would be retained and meet Malheur Forest Plan standards, thus providing cover to big game using this subwatershed. In addition, harvest prescriptions for variable thinning are designed to retain patches of unharvested trees on 5 to 15 percent of stands, therefore, distribution of cover would likely be better than the model can predict. Furthermore, an additional analysis was completed to estimate effects to cover from proposed treatments in this subwatershed over time.

To complete this exercise, stands within this subwatershed had proposed treatments modelled first, and then stands were grown out for 10 years after treatments were completed. Finally, the Habitat Effectiveness Model used to calculate cover was run again with this 10 year data for this subwatershed. Results showed satisfactory cover increased above standards after 10 years. Thus,

it is very likely the temporary reduction in satisfactory cover in Wiwaanaytt Creek subwatershed would meet Malheur Forest Plan standards in the midterm. However, reducing satisfactory cover in gentle to rolling terrain can reduce effectiveness of existing stored road barriers as trees thinned or removed to move the landscape towards historical range of variability may allow or encourage motorized vehicles to drive around barriers.

For additional details on these methods and the Habitat Effectiveness Model, see the Wildlife Report, Management Indicator Species section under Rocky Mountain Elk.

These cover amendments would allow treatments that contribute to restoration efforts in this subwatershed and move the area towards historical range of variability (consistent with 36 CFR § 219.8(a)(1)(vi), § 219.9(a)(1), and § 219.10(a)(1)). Ecosystem integrity would also be improved by increasing forage, which fits within the natural range of variability for this area (consistent with 36 CFR § 219.9(a)(1)). Following treatment, this subwatershed and Austin planning area would be more responsive to dominant ecological processes of the area, including wildland fire and climate change (consistent with 36 CFR § 219.8(a)(1)(iv) and § 219.10(a)(8)).

Cumulative Effects

Since Malheur Forest Plan was signed in 1990, there have been eighteen forest plan amendments affecting big game cover, including nine specific to big game summer range, four specific to winter range, and five specific to both summer and winter range. Most of these amendments allowed reductions of satisfactory cover below forest plan standards. A few amendments allowed reductions of marginal cover or total cover within summer range.

Malheur Forest Plan directs that cover determinations for site specific projects be calculated on a subwatershed basis. There are 178 subwatersheds with a total of approximately 1,338,800 acres of big game summer range on the Forest. Past projects with approved amendments affecting summer range occurred in portions of 14 of these subwatersheds, less than 8 percent of the 178 subwatersheds. These past projects are well distributed across the Forest.

Three of the amendments were located in the Silvies subbasin summer range (Silvies Canyon in 2003, Soda Bear in 2012, and Badger Timber Sale in 1997), one in the Harney-Malheur Lakes summer range (Prater in 1995), two in the Upper John Day summer range (Magone and Olmstead), one in the Middle Fork John Day summer range (Galena), and two in the Upper Malheur River summer range (Upper Pine in 2013, and Cliff Knox in 2022). Two of the projects (Olmstead and Silvies Canyon) had authorized amendments that were completed over 10 years ago. The status of road storage proposed to offset temporary reduction in cover (assuming that cover removed through thinning would grow back over time) is unknown.

The Malheur Forest Plan Record of Decision (USDA Forest Service 1990c, ROD-13) authorized different cover standards for seven summer range watersheds. Austin Project would be the tenth forest plan amendment that allows a reduction of summer range satisfactory, marginal, or total cover below forest plan standards in the 33 years since Malheur Forest Plan was approved. Austin Project would be the second project to authorize a reduction in cover in summer range amendment in Middle Fork John Day River subbasin, with Galena being the first.

The proposed action would increase the number of subwatersheds where cover amendments have been approved by one, increasing the total to 15 out of 178 subwatersheds that contain cover amendments to big game summer range. This would result in a total of 193,027 acres of summer range affected by cover amendments across these 15 watersheds, or 14 percent of all summer

range across the Forest. Note, this percentage is an overestimation since not all acres of each subwatershed are affected by the amendments, therefore the actual amount would be less.

The proposed action would affect cover on approximately 88 percent (9,947 out of 11,280 total acres) of summer range in Wiwaanaytt subwatershed, which translates to less than 1 percent of summer range across the forest.

Once cover is treated below forest plan standards, it is not permanently diminished. It is expected that residual vegetation would respond to treatments in such a way that cover values would improve up to or beyond forest plan standards in the mid-term (pending degree of departure). In response to treatments in the long-term, marginal cover (post-treatment) would likely become satisfactory cover, and areas termed "forage" with values just below those considered marginal cover would likely become marginal cover.

Increases in cover values would be expected post-treatment depending on prescribed fire, site-specific productivity, and environmental conditions (for example, drought). Return of cover was also supported by the modeling exercise done for Austin (see above in the Direct and Indirect Effects section) where modeled stand growth showed satisfactory cover returning to above forest plan standards in the subwatershed within 10 years post-treatment. Eleven of the 18 projects that amended Malheur Forest Plan to reduce cover below forest plan standards (Cow Cabin, Dads, Gabe, Galena, Leek, Magone, Olmstead, Silvies Canyon, Slip and Slide, Soda Bear, and Upper Pine) indicated that proposed road storage would mitigate the loss of vegetative cover. However, the extent of road storage implementation or its effectiveness is unknown. Further, a reduction in cover typically assumes an increase in forage. Forage is an important component of summer range, but particularly important to big game in late summer when available forage begins to dry out and competition from livestock grazing becomes more concentrated to areas with residual suitable forage. Increases in quality and quantity of forage contributes to adequate nutrition for lactating females, growing fawns, and calves, as well as ensuring sufficient body condition in males entering breeding season in fall. However, this potential benefit is less likely to be realized in this project due to the lack of cover.

Site-Specificity

Wiwaanaytt Creek subwatershed in Austin planning area is 11,280 acres and borders Wallowa-Whitman National Forest to the east. This area currently has conditions similar to adjacent watersheds within Austin; therefore, this proposed forest plan amendment is needed to address the need for change and site-specific conditions in the planning area. The ingrowth of grand fir, Douglas-fir, and lodgepole pine due to fire suppression has increased stand densities and shifted species composition to predominantly late seral species as compared to historical conditions.

Past management practices have also resulted in Austin planning area being outside of historical range of variability for late and old structure, where some late and old structural stages are below historical range of variability, and a large proportion of the planning area is in fire regime condition class 3. Proposed restoration treatments are designed to restore historically present tree species composition; reduce stand densities and stress due to competition; protect old trees; increase resiliency of late and old structure stands; and restore the landscape to a more historically fire-resilient condition.

Removal of Trees 21 Inches or Larger Diameter at Breast Height and Harvest within and Reduce Late and Old Structure Stands

Based on the need for change, site-specific conditions in Austin planning area, and relevant Malheur National Forest-specific information and data, the following substantive requirements of 36 Code of Federal Regulations 219.8 through 219.11 apply to the proposed amendments to remove trees 21 inches or larger diameter at breast height and harvest within late and old structure stands in Austin planning area.

As discussed in previous sections, there is a need to change the Malheur Forest Plan, as amended, to better reflect current conditions and scientific understanding regarding necessary restoration of Austin planning area. These amendments are being addressed jointly because they are both associated with the Eastside Screens, standard 6(d), scenario A (interim wildlife standard) where one or both of the late and old structural stages falls below historical range of variability in a particular biophysical environment.

The combination of past practices such as timber harvest and fire suppression have gradually converted dry pine and mixed conifer forests in Austin planning area from primarily long-lived, early seral species (ponderosa pine and western larch) to a higher proportion of late seral species (grand fir and Douglas-fir) (Johnston 2017, Johnston et al. 2018). Frequent low-severity fire regimes historically maintained ponderosa pine and western larch as the dominant species in both dry pine and mixed conifer stands (Johnston et al. 2018). Grand fir and Douglas-fir historically were not a major component within dry forest types, but were present on the landscape, primarily on northern slopes and topographic depressions with higher availability of moisture (Johnston et al. 2016).

The Austin and Whitney tract had 38 trees per acre yellow pine (older ponderosa pine) and 18.47 trees per acre of other species, with 81.6 percent of trees over 12 inches diameter at breast height being yellow pine (Munger 1917) (consistent with §219.8(a)(1)(vi)). Ponderosa pine and western larch historically were a much larger component of mixed conifer forests but have decreased through time due to ingrowth of grand fir.

Ingrowth of younger grand fir and Douglas-fir trees has also substantially increased stand densities and multi-layered canopies that have increased the risk of tree mortality to old ponderosa pine and western larch due to competition induced drought stress, insects and disease, and uncharacteristic wildfire. Both dry pine and mixed conifer forests are considerably denser and have much higher basal area today than they did historically (Johnston et al. 2018)) (§219.8(a)(1)(iv) and §219.10(a)(8)).

Stand structures in the planning area currently do not reflect desired condition based on historical references (Countryman and Justice 2010). Currently, Austin planning area is outside historical range of variability for late and old structure within all potential vegetation groups analyzed (See the Potentially Affected Environment section of the Structural Stages measure under Forest Health and Resiliency). Both dry and moist upland forest potential vegetation groups are below historical range of variability for old forest single-stratum, and either within or above for old forest multi-strata. The cold upland forest potential vegetation group is below historical range of variability for old forest multi-strata and within for old forest single-stratum.

Larger high-severity wildfires are a threat to the sustainability of forest resources and ecosystems in Austin planning area, which has departed from its historical fire regime characterized by

frequent fires (approximately 10 to 20 years) of low (surfaces fires most common) severity (Johnston et al. 2017) (consistent with §219.8(a)(1)(iv)) and §219.10(a)(7)). Eighty-seven percent of Austin planning area falls within fire regime I, which is characterized as generally low- to mixed-severity fires replacing less than 25 percent of dominant overstory vegetation. Currently, 90 percent of Austin planning area falls within fire regime I condition class 3, which is characterized by high departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity, and pattern; and other associated disturbances.

The proposed forest plan amendments are needed to address the need for change and site-specific conditions in the planning area described above. Proposed restoration treatments are designed to restore historically present tree species composition, reduce stand densities and stress due to competition, protect old trees, increase resiliency of late and old structure stands, and restore the landscape to a more historically fire-resilient condition (§219.8(a)(1)(v) and §219.8(a)(1)(vi)). The ecosystem structure and function within the landscape would be restored by moving tree species composition toward the ecologically desired mix of fire-resistant species (§219.8(a)(1)(ii)).

Within the planning area, there are foreseeable risks to ecological sustainability because of the current imbalance of tree species composition, density, and stand structures (§219.10(a)(7)). Proposed treatments would begin to restore the landscape condition (integrity) (§219.9(a)(1)), including stand structures and densities, species composition, and function (ability to withstand insects, diseases, and fire) while also restoring habitats for historically present plant communities and wildlife habitat (§219.8(a)(1)(iii) and §219.10(a)(1)).

Treatments would develop an ecological balance and diversity of structural stages and tree species composition across the landscape that better reflect the historical range of variability (§219.9(a)(2)). Maintaining or enhancing ecologically appropriate old forest conditions provides ecosystem types and habitat for Malheur Forest Plan management indicator species for old growth (§219.9(a)(2)(i)). Management indicator species are commonly enjoyed and used by the public for trapping (Pacific marten) and observing (pileated woodpecker and three-toed woodpecker) (§219.10(a)(5)).

Direct and Indirect Effects

No Action Alternative

Direct and indirect effects result from the proposed action and thus are not germane to the no action alternative. Forest vegetation and other conditions that would result from taking no action are summarized below.

Under the no action alternative, there would be no removal of any trees within the planning area, other than activities that fall under previous decisions described in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions.

Without action, there would be no harvest within late and old structure stands or removal of trees 21 inches diameter at breast height or larger. Old forest single-stratum would continue to be below historical range of variability into the future and old forest multi-strata would increase to be approximately 3 times above the upper range of historical range of variability for both dry and moist upland forest potential vegetation groups. Cold potential vegetation group is the only one where, without action, late and old structure would either be within or slightly above historical

range of variability into the future (see effects of the No Action Alternative for Structural Stages in the Forest Health and Resiliency section).

Without action, stand density would continue to increase in Austin planning area. Currently approximately 78 percent of the forested area in Austin is categorized as being overstocked and is above the desired management zone. By 40 years post-treatment approximately 94 percent of the planning area would be overstocked (see effects of the No Action Alternative for Stand Density in the Forest Health and Resiliency section).

In overstocked stands, trees focus their energy on attaining sunlight for photosynthesis and are less likely to produce cones for future tree recruitment and wildlife forage. Trees also have increased stress, which leads to increased susceptibility to insects and diseases. Species that need sunlight usually die, and shrubs and herbs may become dormant. Establishment of new trees is precluded by a lack of sunlight or of moisture (Powell 1998).

Large overstory ponderosa pine would continue to weaken due to moisture stress resulting from competition in overstocked stands. Western larch would continue to lose vigor due to dense stand conditions that reduce crown width and crown height. Both of these tree species and size classes are important to a wide variety of wildlife species. Susceptibility to insect and disease disturbances in excess of historical range of variability would continue to increase. Large snags would likely increase due to tree mortality from the above causes, benefiting snag-dependent species in areas where roads do not provide access for firewood cutting.

Fire effects would result in higher stand loss as seen in the Canyon Creek Complex Fire of 2015, which burned in similar fuels profiles. The majority of the planning area is currently prone to high tree mortality through cambium kill and crown fire. Disturbances would be of a higher severity, increased mortality of larger trees, and over a larger area than under historical conditions. Specifically, patch sizes of high severity would be larger.

Recent fires in eastern Oregon, including on the Forest in 2013, 2014, and 2015 indicate that in similar conditions as those in the planning area, tree mortality through cambium kill and crown scorch could burn through most of the planning area. Historically, these stands burned with low large tree mortality, as surface fires with average flame lengths less than 4 feet and occasional single tree torching. Severe fire affecting a large portion of the planning area would negatively impact most species.

Proposed Action

Direct and indirect effects for treatment within late and old structure stands and potential effects to wildlife are discussed in the Old Forest and Large Tree Structure Habitats and Associated Wildlife Species section. Under the proposed action, young (less than 150 years old) relatively large (21 inches or larger diameter at breast height) grand fir and Douglas-fir trees would be removed on approximately 3,020 acres.

The proposed action would restore the ecosystem structure and function would be restored by shifting tree species composition toward the ecologically desired mix of fire-resistant, early seral tree species (ponderosa pine and western larch) (consistent with §219.8(a)(1)(ii), §219.8(a)(1)(iii), §219.8(a)(1)(vi), §219.9(a)(2), and §219.10(a)(1)). Encroaching grand fir and Douglas-fir trees 21 inches or larger diameter at breast height (but less than 150 years old) would be removed, reducing the risk of future insect outbreaks and uncharacteristic wildfire, while also

restoring habitats for historically present plant communities and wildlife habitat (consistent with §219.8(a)(1)(iv), §219.9(a)(2)(i), §219.10(a)(5)), and §219.10(a)(8)).

Approximately 4,360 acres of old forest multi-strata and approximately 660 acres of old forest single-stratum are proposed for commercial restoration treatment. Young grand fir and Douglas-fir 21 inches or larger diameter at breast height, as well as select individuals of other species up to 21 inches diameter at breast height, are proposed for removal. Directly after proposed restoration treatments, old forest single-stratum would increase in dry and moist upland forest potential vegetation groups and decrease in cold upland forest potential vegetation group. Old forest multi-strata would decrease within all potential vegetation groups in Austin planning area (see Structural Stages measure of the Issues Considered for Analysis section).

Modeling indicates that directly after treatment, total late and old structure remains the same in dry upland forest potential vegetation group, decreases by 4 percent in cold upland forest potential vegetation group, and decreases by approximately 6 percent in moist upland forest potential vegetation group. Ten years after treatment, modeling indicates that late and old structure within all three potential vegetation groups has recovered from effects of treatment and exceeds existing condition.

Total late and old structure within dry upland forest potential vegetation group would exceed existing condition by approximately 9 percent, within cold upland forest potential vegetation group by approximately 2 percent, and in moist upland forest potential vegetation group by approximately 1 percent. In the long-term, restoration treatments for the proposed action set Austin planning area on a trajectory for all three potential vegetation groups to be either within or closer to historical range of variability for old forest single-stratum and old forest multi-strata when compared to taking no action (consistent with §219.9(a)(2)).

Proposed treatments will decrease stand density through a combination of thinning from below and removal of some young grand and Douglas-fir over 21 inches diameter at breast height. Approximately 69 percent of forested stands would be within or below the management zone directly after treatment, compared to 22 percent if no action is taken. Approximately 46 percent of forested stands would be at healthy stocking levels in the long-term compared to 6 percent given no action. Treated stands would be more resilient to natural disturbances such as insects, disease, and wildfire (consistent with §219.9(a)(1), §219.8(a)(1)(iii), and §219.10(a)(1)). Restoration treatments would reclassify a majority of late and old structure stands to be within their management zones and increase resiliency at the landscape scale (consistent with §219.8(a)(1)(vi)).

The proposed action would lead to an increased proportion of ponderosa pine and western larch within late and old structure stands and across the planning area. We would thin around large and old overstory ponderosa pine and western larch to a distance of double the dripline, where nearly all trees within this zone would be removed (see draft Austin silviculture prescription). Proposed treatments would increase growing space, resources, and remove direct competition to these trees resulting in increased tree vigor and resistance to insects, disease, and drought stress. Ladder fuels would be removed from around these trees as well, decreasing risk of torching and mortality caused by fire during prescribed burning or wildfire.

Restoration treatments in the proposed action would allow for reintroduction of fire and transition Austin planning area to a more historically fire-resilient landscape characterized by

frequent, low-severity fires (consistent with §219.8(a)(1)(v)). Specifically, this amendment would allow restoration treatments within late and old structure stands to create conditions conducive for reintroduction of fire back into late and old structure while decreasing risk of mortality to large and old ponderosa pine and western larch trees. Treatments would decrease stand density, ladder fuels, surface fuels, and flame lengths, decreasing overall fire severity when these stands burn.

Cumulative Effects

The effects from past, present, and foreseeable projects must overlap temporally and spatially with this project to contribute to a cumulative effect. Cumulative effects for these proposed forest plan amendments are addressed at the subbasin and Forest scales as described below.

In the 27 years Regional Forester's Forest Plan Amendment 2 has been in place, the Malheur National Forest has authorized 15 forest plan amendments to standard 6(d) scenario A(2)(a) to allow removal of trees 21 inches or larger diameter at breast height. Amendments to remove live trees 21 inches or larger diameter at breast height have been authorized on approximately 45,000 acres (2.6 percent) of the Malheur National Forest.

Amendments have been distributed across the Malheur National Forest to accomplish a variety of specific purposes including reducing the spread of insects and diseases, aspen restoration, fire salvage, rock pit expansion, restoring historical tree species composition and improving the survivability of older trees. Recent projects have been proposed to shift species composition, protect old ponderosa pine and western larch, and restore unique habitats (for example, aspen).

The effects of removing trees 21 inches or larger diameter at breast height in several past projects such as the 1996 Parish Timber Sale, 1997 Clear Creek project, and 1997 Badger Timber Sale have likely recovered with the growth and development of additional large trees over the last 20 years.

There have also been four amendments to standard 6(d) scenario A to allow harvest within late and old structure when one or more structural stages fall below the historical range of variability. The 2010 Damon Wildland Urban Interface Project, located in Silvies subbasin, allowed conversion of 253 acres of old forest multi-strata structure in the warm dry plant association group to old forest single-stratum. This reduced the percentage of old forest multi-strata structure to 4 percent, below the lower end of historical range of variability (5 percent). Damon Wildland Urban Interface Project converted old forest multi-strata structure to old forest single-stratum structure, so there was no loss of late and old structure on the Forest as a result.

The remaining three forest plan amendments have been within projects in Middle Fork John Day subbasin. The 2015 Big Mosquito Project reduced old forest multi-strata in the warm dry plant association group by approximately 600 acres, reducing the percentage of old forest multi-strata to 18 percent directly after treatment, which is within historical range of variability. The 2020 Camp Lick project commercially treated approximately 380 acres of old forest single-stratum within the warm dry plant association group, but late and old structure was not reduced.

For the 2020 Ragged Ruby Project, approximately 120 acres were removed from late and old structure, 440 acres transitioned from old forest multi-strata to old forest single-stratum, and 590 acres remained old forest multi-strata. Despite 120 acres being removed from late and old structure, due to growth of trees in other stands, there was no net loss of late and old structure after treatment was modeled.

Combined, the Damon Wildland Urban Interface, Big Mosquito, Camp Lick, and Ragged Ruby project amendments impacted 2,443 acres of late and old structure; resulting in approximately 0.1 percent of the 1.7 million acre Malheur National Forest having been impacted over time.

Implementation of Damon Wildland Urban Interface Project is complete, with the exception of some prescribed burning. Implementation of Big Mosquito Project began after the project was signed in late 2015. Implementation of the Camp Lick Project began in 2020 and implementation of Ragged Ruby Project began in 2021. Restoration activities within these projects could take approximately 5 to 10 years to complete, which could distribute the potential affected area of Middle Fork John Day River subbasin over approximately 20 years.

Table 47. Summary of projects with forest plan amendments to Regional Forester's Eastside Forest Amendment 2, standard 6(d), scenario A (amendments to allow loss of late and old structure).

Number of Projects with Amendments to Remove Trees 21 Inches or More DBH*	Year	District Subbasin	Project	Amendment Rationale	Scale of Amendment
1	2010	Blue Mountain, Silvies	Damon Wildland Urban Interface Project	To allow conversion of 253 acres of old forest multi-strata structure in Warm Dry plant association group to old forest single-stratum. This reduced percentage of old forest multi-strata structure to 4 percent, below the lower end of the historical range of variability of 5 percent. The amendment authorized conversion of old forest multi-strata to old forest single-stratum in Warm Dry plant association group to reduce fuels within wildland urban interface in stands that were a fire risk to private lands or overstocked and likely unsustainable given their stand structure, species compositions, and location in dryer forest types. The Damon Wildland Urban Interface Project converted old forest multi-strata structure to old forest single-stratum structure, so technically there was not a loss of late and old structure on the Forest as a result.	253 acres of Damon planning area
2	2015	Blue Mountain, Middle Fork John Day River	Big Mosquito	To allow removal of grand fir trees greater than 21 inches diameter at breast height that currently exist within Warm Dry late and old structure stands, to reduce acres of old forest multi-strata.	600 acres of Big Mosquito planning area
3	2020	Blue Mountain, Middle Fork John Day River	Camp Lick Project	To allow commercial removal within approximately 380 acres of old forest single-stratum stands in Warm Dry plant association group. Acres of late and old structure would not be reduced.	380 acres of Camp Lick planning area

4	2020	Blue Mountain, Middle Fork John Day River	Ragged Ruby Project	To allow approximately 50 acres of commercial thinning within old forest multi-strata stands in Hot Dry plant association group and approximately 1,160 acres of upland restoration treatments within late and old structure stands in Warm Dry plant association group. Approximately 120 acres will be removed from late and old structure, 440 acres will transition from old forest multi-strata to old forest single-stratum, and 590 acres will remain old forest multi-strata. Despite some stands being removed from late and old structure, there will still be no net loss of late and old structure after treatment. This amendment includes removal of both trees less than 21 inches diameter at breast height and young (less than 150 years old), relatively large (21 inches or larger diameter at breast height) grand fir and Douglas-fir.	1,210 acres of Ragged Ruby planning area
5	2022	Prairie City, Upper Malheur	Cliff Knox Project	To allow silvicultural treatments within old forest single-stratum stands in Warm Dry and Hot Dry plant association groups (which is currently below historical range of variability) and there would be no net loss of late and old structure within the planning area.	900 acres of Cliff Knox planning area

*DBH: diameter at breast height.

Table 48. Summary of projects with forest plan amendments to Regional Forester's Eastside Forest Plan Amendment 2, standard 6(d), scenario A(2)(a) (amendment to remove trees 21 inches or larger diameter at breast height).

Number of Projects with Amendments to Remove Trees 21 Inches or More DBH*	Year	District Subbasin (Hydrologic Unit Code 8)	Project	Amendment Rationale	Scale of Amendment
1	1996	Blue Mountain, Silvies	Parish Timber Sale	Remove a portion of the large component trees in stands with insect infestation and mistletoe infection to promote future healthier, vigorous, big-tree forest stands.	An estimated 235 acres
2	1997	Prairie City, Middle Fork John Day	Clear Creek – 91B Analysis Area	Reduce inter-tree competition to promote growth of future large trees and improve the health and vigor of existing large trees. Reduce existing levels of dwarf mistletoe and future spread of dwarf mistletoe to susceptible healthy trees. Improve economic viability of proposed treatments.	Approximately 2,119 acres in Clear Creek subwatershed.

3	1997	Emigrant Creek, Silvies	Badger Timber Sale	To decrease shading of aspen stands by encroaching conifers.	Approximately 92 acres of aspen restoration.
4	2006	Blue Mountain, Silvies	Starr Rock Pit	To allow expansion of the existing 6.2-acre Starr Rock Pit by 2.7 acres to provide a long-term, economical, and readily accessible source of aggregate material that meets quality standards for transportation projects.	6-10 trees ≥21 inches diameter at breast height within an approximately 3-acre area in the Starr subwatershed (approximately 18,300 acres of which are located on the Malheur National Forest).
5	2008	Blue Mountain, Upper John Day	Thorn Fire Salvage	To define both live and trees in order to meet the purpose and need of recovering the economic value of the available dead and dying trees.	To be applied on 2,529 acres of commercial salvage. The analysis area included 7,783 acres of the Shaketable fire that burned in 2006.
6	2012	Blue Mountain, Silvies	Soda Bear	To improve the retention and survivability of older trees and transition the landscape to a more historically present fire-resistant species.	Approximately 8,400 acres of the planning area.
7	2015	Emigrant Creek, Upper Malheur	Wolf	To maintain and enhance the conditions of aspen stands through reducing conifer shading within aspen stands.	Approximately 35 acres of the planning area.

8	2015	Prairie City, Upper Malheur	Elk 16	Removal of young (less than 150 years old), relatively large (≥21 inches diameter at breast height) grand fir and Douglas-fir trees where it will favor healthy ponderosa pine, western larch, and aspen in the Warm Dry plant association group. Several sources of information show that grand fir 21 inches diameter at breast height or larger have grown in since the suppression of fire in the planning area. Although these grand fir are large, they are not old and are threatening the survival of fire-resistant long-lived early-seral ponderosa pine and western larch, some of which are true old-growth trees. Maintaining a consistent and sustainable long-lived early-seral presence on the landscape will improve forest heterogeneity and restore resiliency.	Removal of Douglas-fir and grand fir trees ≥21 inches diameter at breast height and less than 150 years on 8,486 acres of the planning area. No trees ≥21 inches diameter at breast height were removed within late and old structure.
9	2015	Blue Mountain, Middle Fork John Day	Big Mosquito	To meet the need to transition the dry forest landscape in the planning area to more historically present tree species compositions and stand structures (structural states) by allowing removal of relatively large (≥21 inches diameter at breast height) grand fir where it would favor healthy ponderosa pine, western larch, and western white pine.	Amendment will be applied to a total of approximately 5,625 acres within the Big Mosquito planning area.
10	2016	Blue Mountain, Silvies	Starr Aspen	Reduce conifers that are currently overtopping and shading aspen, and those that have the potential to in the future, by creating conditions that will allow for successful aspen regeneration and development and an increase in stand size. Western larch will have a 21 inches diameter at breast height cut limit. Additionally, all grand fir, ponderosa pine, and Douglas-fir over 30 inches diameter at breast height will be retained, as modified by objection resolution.	357 acres in the Starr subwatershed.

11	2017	Prairie City, Upper Malheur	Summit	To remove young (less than 150 years old), relatively large (21 inches diameter at breast height or larger) grand fir and Douglas-fir trees competing with older ponderosa pine, western larch, or aspen trees, causing competition stress and increasing the risk the older trees may die as a result of insects, drought, or wildfire.	Approximately 8,308 acres in the Warm Dry plant association group and 73 acres in aspen stands.
12	2018	Emigrant Creek, Silvies	Flat	To cut and remove conifer trees between 21 and 30 inches diameter at breast height to result in better growing conditions for aspen and promote their existence across the landscape.	Approximately 147 acres of aspen stands.
13	2019	Harney – Malheur Lakes	Rattlesnake HFRA Project	To remove young (less than 150 years old), relatively large (21 inches diameter at breast height or larger) grand fir trees competing with older ponderosa pine trees, causing competition stress and increasing the risk the older trees may die as a result of insects, drought, or wildfire.	Approximately 502 acres upland treatment and 62 acres of aspen treatment.
14	2020	Blue Mountain, Middle Fork John Day River	Camp Lick	To remove young (less than 150 years old), relatively large (21 inches diameter at breast height or larger) grand fir and Douglas-fir trees competing with older ponderosa pine and western larch trees, causing competition stress and increasing the risk the older trees may die as a result of insects, drought, or wildfire.	Approximately 4,700 acres in the grand fir and Douglas-fir plant association group stands in stand improvement commercial thinning units
15	2020	Blue Mountain, Middle-Fork John Day River	Ragged Ruby	To remove young (less than 150 years old), relatively large (21 inches diameter at breast height or larger) grand fir and Douglas-fir trees in the Warm Dry and Hot Dry plant association groups competing with older ponderosa pine and western larch trees, causing competition stress and increasing the risk the older trees may die as a result of insects, drought, or wildfire.	Approximately 3,400 acres in the Warm Dry and Hot Dry plant association group in the commercial thinning units

The proposed action proposes to allow approximately 5,020 acres of commercial removal within late and old structure stands in Austin planning area. Within Middle Fork John Day River subbasin, this amendment would increase acres of late and old structure treated from approximately 2,190 acres to approximately 7,210 acres. The Big Mosquito, Camp Lick, and Ragged Ruby projects combined with Austin proposed actions would impact approximately 3 percent of the 271,000-acre Middle Fork John Day River subbasin.

Within the Forest, this amendment would increase acres of late and old structure treated from approximately 2,443 acres to approximately 7,463 acres. The Damon Wildland Urban Interface Project, Big Mosquito, Camp Lick, Ragged Ruby, and Cliff Knox projects combined with Austin would impact approximately 0.4 percent of the 1.7 million-acre Malheur National Forest.

The Austin Project, could increase acres impacted by harvest within or reduction of late and old structure from approximately 2,443 to 8,363 acres, resulting in approximately 0.5 percent of the 1.7 million-acre Malheur National Forest being impacted over time.

For summary of effects to wildlife associated with late and old structure habitat, see section on Old Forest and Large Tree Structure Habitats and Associated Wildlife Species.

The amendment meets the intent of 36 Code of Federal Regulations Part 219.8 through 11.

Site-Specificity

The proposed forest plan amendment is needed to address the need for change and the site-specific conditions in the planning area as described above. The ingrowth of grand fir, Douglas-fir, and lodgepole pine due to fire suppression has increased stand densities and shifted species composition to predominantly late seral species as compared to historical conditions.

Past management practices have also resulted in Austin planning area being outside historical range of variability for late and old structure, where some late and old structural stages are below historical range of variability, and a large proportion of the planning area in fire regime condition class 3. Proposed restoration treatments are designed to restore historically present tree species composition, reduce stand densities and stress due to competition, protect old trees, increase resiliency of late and old structure stands, and restore the landscape to a more historically fire-resilient condition.

Maintaining Connectivity Between All Late and Old Structure and Old Growth Stands

Based on need for change, site-specific conditions in Austin planning area, and relevant Malheur National Forest-specific information and data, the following substantive requirements of 36 Code of Federal Regulations 219.8 through 219.11 apply to the proposed amendment to not maintain connectivity between all late and old structure and old growth stands in Austin planning area for the proposed action.

As discussed previously, there is a need to change Malheur Forest Plan, as amended, to not maintain designated connectivity between all late and old structure stands in order to allow for restoration treatments that would reduce stand density to increase forest health and resiliency and reduce risk from stand-replacing wildfire, and to shift stand structure and tree species composition to better meet historical conditions.

The combination of past practices such as timber harvest and fire suppression have gradually converted dry pine and mixed conifer forests in Austin planning area from primarily long-lived, early seral species (ponderosa pine and western larch) to a higher proportion of late seral species (grand fir and Douglas-fir) (Johnston 2017, Johnston et al. 2018). Frequent low-severity fire regimes historically maintained ponderosa pine and western larch as the dominant species in both dry pine and mixed conifer stands (Johnston et al. 2018).

Grand fir and Douglas-fir historically were not a major component within dry forest types, but were present on the landscape, primarily on northern slopes and topographic depressions with higher availability of moisture (Johnston et al. 2016). Ingrowth of younger grand fir and Douglas-fir trees has also substantially increased stand densities and multi-layered canopies that have increased risk of tree mortality to old ponderosa pine and western larch due to competition induced drought stress, insects and disease, and uncharacteristic wildfire. Both dry pine and mixed conifer forests are considerably denser and have much higher basal area today than they did historically. (§219.8(a)(1)(iv) and §219.10(a)(8)).

The proposed forest plan amendment is needed to address the need for change and site-specific conditions in the planning area described above. Specifically, proposed upland restoration treatments would move the planning area toward historical range of variability for stand structure and tree species composition, restore the planning area to a more historically fire-resistant condition, and reduce stand densities and stress due to competition (§219.8(a)(1)(v) and §219.8(a)(1)(vi)).

Ecosystem structure and function within the landscape would be restored by moving tree species composition toward the ecologically desired mix of fire-resistant species (§219.8(a)(1)(ii)). Old trees would be protected, and species composition would shift to a higher proportion of early seral species (§219.9(a)(2)(i)). Management indicator species are commonly enjoyed and used by the public for trapping (Pacific marten) and observing (pileated woodpecker and three-toed woodpecker) (§219.10(a)(5)). See Wildlife Report for analysis to management indicator species and Austin Appendix E – Consistency with Forest Plan, Law, Regulation, and Policy.

Direct and Indirect Effects

No Action Alternative

Direct and indirect effects result from the proposed action and thus are not germane to the no action alternative. Forest vegetation and other conditions that would result from taking no action are summarized below.

Under the no action alternative, there would be no removal of any trees within the planning area, other than activities that fall under previous decisions described in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions.

Without action, there would be no connectivity corridors designated and also no additional treatments authorized in Austin planning area. Forest stands would continue on their current trajectory. Old forest single-stratum would continue to be below historical range of variability into the future and old forest multi-strata would increase to be approximately 3 times above the upper range of historical range of variability for both dry and moist upland forest potential vegetation groups. The cold upland forest potential vegetation group is the only one where, without action, late and old structure would either be within or slightly above historical range of

variability into the future (see effects of the No Action Alternative for Structural Stages in the Forest Health and Resiliency section).

Without action, stand density would continue to increase in Austin planning area. Currently approximately 78 percent of the forested area in Austin is categorized as being overstocked and above the desired management zone. By 40 years post-treatment, approximately 94 percent of the planning area would be overstocked (see effects of the No Action Alternative for Structural Stages in the Forest Health and Resiliency section).

In overstocked stands, trees focus their energy on attaining sunlight for photosynthesis and are less likely to produce cones for future tree recruitment and wildlife forage. Trees also have increased stress, which leads to increased susceptibility to insects and diseases. Species that need sunlight usually die, and shrubs and herbs may become dormant. Establishment of new trees is precluded by lack of sunlight or of moisture (Powell 1998).

Fire effects would result in higher stand loss as seen in the Canyon Creek Complex Fire (2015) which burned in similar fuels profiles. The majority of the planning area is currently prone to high tree mortality. Disturbances would be of higher severity, increased mortality of larger trees, and over a larger area than under historical conditions (see Fire Behavior section). Specifically, patch sizes of high severity would be larger.

Recent fires in eastern Oregon, including on the Forest in 2013, 2014, and 2015 indicate that in similar conditions as those in the planning area, tree mortality through cambium kill and crown scorch could burn through a majority of the planning area. Historically, these stands burned with low large tree mortality, as surface fires with average flame lengths less than 4 feet and occasional single tree torching. Severe fire affecting a large portion of the planning area would negatively impact a majority of species.

Proposed Action

Wildlife connectivity corridors would be designated between all management area 13 stands and to wildlife connectivity corridors in adjacent watersheds, however, not all late and old structure stands would be connected. Approximately 9,220 acres of connectivity would be designated to connect all management area 13 stands and approximately 65 percent of late and old structure stands would be connected two ways.

The proposed action would restore ecosystem structure and function by allowing treatments that would shift tree species composition toward the ecologically desired mix of fire-resistant, early seral tree species (ponderosa pine and western larch) (consistent with §219.8(a)(1)(ii), §219.8(a)(1)(vi), §219.9(a)(2), and §219.10(a)(1)). Encroaching grand fir and Douglas-fir would be removed, reducing risk of future insect outbreaks and uncharacteristic wildfire, while also restoring habitats for historically present plant communities and wildlife habitat (consistent with §219.8(a)(1)(iv), §219.9(a)(2)(i), §219.10(a)(5)), and §219.10(a)(8)).

Proposed treatments within designated connectivity corridors would decrease stand density to a healthy stocking level (See Removal of Trees 21 Inches or Larger Diameter at Breast Height and Harvest within and Reduce Late and Old Structure Stands section above in this Evaluation of Proposed Forest Plan Amendments section for more information. Treatments would have higher basal areas, retain larger and old trees, and retain 15 percent of unharvest patches, or “skips”, throughout stands. Treated stands would be more resilient to natural disturbances such as insects, disease, and wildfire (consistent with §219.9(a)(1) and §219.10(a)(1)).

Restoration treatments would reclassify a majority of late and old structure stands to be within their management zones and increase resiliency at the landscape scale (consistent with §219.8(a)(1)(vi)). Treatments would also move stands towards historical range of variability goals directly after treatment and set late and old structure stands up to be within or above historical range of variability in future (consistent with §219.9(a)(2)).

Large high-severity wildfires are a threat to sustainability of forest resources and ecosystems in Austin planning area, which had departed from historical fire regimes characterized by frequent low and mixed-severity fires §219.8(a)(1)(v)), §219.10(a)(7)). Restoration treatments are proposed to allow for reintroduction of fire and transition Austin planning area to a more historically fire-resilient landscape (consistent with §219.8(a)(1)(v)).

Cumulative Effects

The proposed forest plan amendment would not connect all late and old structure stands in Austin planning area in two directions. However, wildlife connectivity would be designated in all management area 13 old growth stands and connectivity would be designated to connect adjacent connectivity corridor stands established in the Galena and Patrick projects. The no action alternative does not propose an amendment to not maintain connectivity between all late and old structure and old growth stands, therefore there would be no cumulative effects associated with that alternative.

Effects from past, present, and foreseeable projects must overlap temporally and spatially with this project to contribute to a cumulative effect. Cumulative effects for this proposed forest plan amendment are addressed at the district and forest scales as described below.

In the 27 years Regional Forester's Forest Plan Amendment 2 has been in place, there have been four amendments to standard 6(d)(3)(a), to not provide connectivity as described: The Dry Fork, Soda Bear, Ragged Ruby, and Cliff Knox projects. The 2000 Dry Fork Project occurred within Dry Fork subwatershed, one of the subwatersheds in the southern portion of Austin planning area and allowed 84 acres to move out of connectivity in order to treat Armillaria root rot. These 84 acres would likely not have currently met criteria to be considered as connectivity with or without treatment due to Armillaria root rot infestation (many trees would have died and fallen over in the past 22 years even without treatment).

In addition, because this older project occurred within Austin, any past treatments to the landscape would be accounted for in existing conditions and were considered in development of proposed connectivity for Austin Project. Therefore, this project would not pose any new or additional cumulative effects to connectivity corridors when combined with Austin Project.

While the Soda Bear Project did not connect every management area 13 and late and old structure stand in two or more ways to avoid placing connectivity corridors in areas that are not sustainable as connectivity, it is in a different geographical area (Silvies subbasin). Therefore, effects from this past project would not overlap spatially with Austin Project and would not pose any cumulative effects with regards to connectivity corridors. The Cliff Knox project is also located in a different geographical area (Upper Malheur subbasin) of the Forest than Austin Project. Because effects from this project do not overlap spatially with Austin Project, there would not be a cumulative effect.

The 2020 Ragged Ruby Project is in the same Middle Fork John Day River subbasin as Austin Project and was considered for cumulative effects. The Ragged Ruby Project designated 2,200

acres of connectivity that connected all management area 13 stands and to adjacent watersheds, but did not connect all late and old structure stands in order to allow for upland restoration activities to reduce stand density, protect old trees, increase spatial heterogeneity, and shift species composition to more early seral species. Therefore, when combined with Austin, there would be a slight decrease in designated connectivity corridors within Middle Fork John Day River subbasin.

While the slight reduction in designated connectivity from Austin and Ragged Ruby projects could pose a slight negative cumulative effect, this affect would likely be minor when all other largescale restoration projects across Middle Fork John Day River drainage are accounted for that designated connectivity corridors including Galena, Camp Lick, and Big Mosquito. Together they have designated a total of approximately 36,050 acres. Each project designated connectivity to connect dedicated old growth, replacement old growth, and late and old structure stands within their respective planning areas, as well as to connect to adjacent project areas.

Through designation of connectivity corridors within Austin planning area, designated corridors would span the entire length of Middle Fork John Day River drainage within the Forest connecting old growth and late and old structure stands. With the inclusion of the proposed action, approximately 19 percent of Middle Fork John Day River drainage would be designated as connectivity corridor. This would maintain areas of higher cover for wildlife associated with old, forested stands and big game and allow for movement across the landscape.

Site-Specificity

The proposed forest plan amendment is needed to address the need for change and site-specific conditions in the planning area. The ingrowth of grand fir, Douglas-fir, and lodgepole pine due to fire suppression has increased stand densities and shifted species composition to predominantly late seral species as compared to historical conditions. Past management practices have also resulted in Austin planning area being outside historical range of variability for late and old structure, where some late and old structural stages are below historical range of variability, and a large proportion of the planning area in fire regime condition class 3. Proposed restoration treatments are designed to restore historically present tree species composition, reduce stand densities and stress due to competition, protect old trees, increase resiliency of late and old structure stands, and restore the landscape to a more historically fire-resilient condition.

Maintaining Current Open Road Density

Travel Management regulations and policy are currently under review at the Agency and Departmental levels; the Regional Forester has directed that Travel Management decisions that would decrease motorized public access be deferred at this time. After collaborating with our Grant County Natural Resource Advisory Committee, a decision on the broader travel management proposals is being deferred except for Crawford Creek road relocation. Exclusion from this decision does not preclude a future decision (with the associated administrative review process) that could authorize these activities. The effects to elk security and cover from not closing roads was identified as an issue not considered for analysis.

The 1990 Malheur Forest Plan Record of Decision (page 11) states, “In those instances where timber and HEI[29] objectives can’t be achieved in summer range, as determined through

[29] Habitat Effectiveness Index model.

monitoring, the plan direction will be amended." The habitat effectiveness index model provides a means of balancing cover quality, cover spacing, and open road densities for estimating elk habitat effectiveness on the landscape (Thomas et al. 1988). See Table 49 and Table 50 below for habitat effectiveness index, cover, and open road density standards by subwatershed, followed by anticipated effects on those metrics for the no action alternative and proposed action, respectively.

This proposed forest plan amendment would allow open road densities of three subwatersheds (Bridge, Dry Fork, and Wiwaanaytt Creek) to remain in excess Malheur Forest Plan forest-wide standard 33 to limit open road density to 3.2 miles per square mile (USDA Forest Service 1990a, pages IV-29). Road density was calculated by the habitat effectiveness index model using existing data from our roads database. This amendment would also allow us not to move toward wildlife management objectives in individual management areas within Austin planning area by storing roads (USDA Forest Service 1990a, pages IV-29).

The existing transportation system in Austin planning area consists of approximately 608 miles of road under Forest Service jurisdiction and management. Road maintenance levels on the Forest are based on type of intended traffic use. Approximately 259 miles are maintenance level 1[30] and approximately 349 miles are maintenance level 2[31]. Existing stored roads in Austin planning area were stored administratively or under National Environmental Policy Act decisions pre-dating the Austin analysis.

Direct and Indirect Effects

No Action Alternative

Under the no action alternative, public use of National Forest System roads and recreation sites would not be affected in the short-term, as there would be no changes to the existing road system. This means no changes to other recreation interests such as snowmobile trails or availability of dispersed campsites.

There are two developed recreation sites within the planning area. Dixie Campground is a developed campground that includes nine individual campsites, two vault toilets, two short trails, and one picnic area. Blue Mountain Summit Sno-park is an Oregon state snow park located near the eastern boundary of Austin planning area. It includes a parking area, a vault toilet, and a snow groomer storage facility. Developed trails in the planning area include 83.3 miles of designated snowmobile trails.

Open road densities would continue to provide motorized recreation opportunities, cultural and traditional uses, administrative access, and general utilization of Forest resources. In addition, there would be little or no impact to motorized public access from proposed actions such as restoration, timber harvest, fuels reduction, or other planned actions. However, it is challenging to maintain the existing large road system, and this alternative does not provide adequate funding for annual road maintenance.

Over the long-term, the volume of deferred maintenance would continue to grow, increasing the risk of road damage and potential for eventual road failure. This could have direct, long-term

[30] Maintenance level 1 roads have been placed in storage, but are available for administrative use (for example, for emergencies or treatments).

[31] Maintenance level 2 roads are open to high clearance vehicular travel.

consequences on public safety and access. Existing roads that are currently contributing sediment to streams in Austin planning area would also continue to do so, affecting streams, associated riparian areas, and limiting opportunities for landscape scale restoration. This alternative also makes no foreseeable improvements to fuel loading or wildfire risk. If left untreated, the density of fuels and risk of high-severity fire would likely increase over time, directly impacting visitation and public access over the short and long-terms.

Malheur Forest Plan selected Rocky Mountain elk as a management indicator species due to their economic and social value, as well as their documented response to changes in forest cover, forage quality, and road densities. While elk are one of the most sought-after species for hunting (ODFW 2022), non-consumptive uses are growing as people seek opportunities for viewing and photographing elk. Elk are also an important traditional food source for local Tribes. Retaining elk on public lands is a high priority and a challenge. While elk populations remain fairly stable across the Blue Mountains, elk distribution has shifted from public to private lands in portions of their range (ODFW 2003). Movement of elk away from public lands has been widely documented (Conner et al. 2001, Vieira et al. 2003, Proffitt 2010) and it appears similar shifts are occurring adjacent to the Forest. This shift in elk distribution can reduce hunter and recreational viewing opportunities on public lands and lead to increased damage to private agricultural lands (Rowland et al. 2018, Wisdom and Cook 2000, Wertz et al. 2001).

While forage and cover are important components of elk habitat, the most consistent variable in determining elk distribution is disturbance from motorized road use (Rowland et al. 2004). Motorized road use leads to greater human disturbance of elk, which encourages them to move off-forest to adjacent private lands, where they cause damage to agricultural fields. This also reduces public hunting and viewing opportunities on the forest (219.10(a)(5)). Such negative impacts from motorized road use to elk have been consistently validated from half a century of research (McCorquodale 2013, Rowland et al. 2004, Wisdom et al. 2005). Half of Austin planning area overlaps with a priority watershed for creating elk security to improve elk distribution on public lands and decrease damage caused by elk on private lands. These priority watersheds were collaboratively mapped across the Blue Mountains with input from the Forest Service, Bureau of Land Management, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, and Rocky Mountain Elk Foundation.

There are five existing elk security blocks covering approximately 4 percent of the total Austin planning area (see Austin Appendix B – Maps, Maps 5 and 6). While these existing elk security areas would remain unchanged under this alternative, they may be less effective due to unauthorized use of stored roads and user-created roads in some areas. Implementing and maintaining effective barriers on stored roads is a challenge on the Forest. Dry Fork, Bridge Creek, and Wiwaanaytt Creek subwatershed habitat effectiveness standards derived from open road densities are slightly higher than the forest plan standard for open road density for the planning area and would remain so, thereby not meeting habitat effectiveness standards for roads. Cover percentages would remain well distributed and could mitigate some impacts from higher road densities, especially because stored roads would not be maintained for haul under this alternative. Marginal cover in Dry Fork subwatershed is technically below the standard; however, satisfactory cover is much greater than the standard and would provide substantial elk cover.

Elk security would remain far below the 30 percent threshold (as recommended by Hillis et al.) to retain elk distribution on National Forest System lands within the planning area. Some areas of elk security may not be as effective due to lack of effective barriers or barrier maintenance along many stored roads which have resulted in unauthorized use and user-created roads in some areas. Elk would likely continue to avoid areas near open roads and stored roads without barriers as motorized traffic increases (for example, for firewood cutting, mushroom gathering, shed hunting, and upland bird and big game hunting) and move into areas of reduced habitat quality (Wisdom and Cook, Wertz et al. 2001, Rowland et al 2004, Rumble et al 2005).

Elk select areas away from roads or increase their movement rates when unable to avoid open roads. Higher movement rates increase energy expenditures and decrease fat reserves; this could lead to poor body condition coming into winter for elk, particularly pregnant and lactating females. Increased elk energy expenditure due to disturbances by motorized vehicles, decreased hunting and viewing opportunities from the public, and increased vulnerability of elk during hunting season are expected to occur in portions of the planning area lacking elk security or adequate cover (Wisdom and Cook, Wertz et al. 2001, Rowland et al 2004, Rumble et al 2005). For more information on the assumption of road existing conditions and impacts to elk from the no action alternative see the Wildlife Report.

Table 49. HEI, cover, and open road density standards followed by existing conditions by subwatershed.

Subwatershed	Hec*	HEs*	Her*	HEI*	Percent S*	Percent M*	Percent Total Cover	Open Road Density (mi/mi^2)
Malheur Forest Plan Standard	0.3	0.3	0.4	0.4	12	5	20	3.2
Bridge Creek	0.86	0.67	0.37	0.57	39.4	15.5	55	3.21
Clear Creek	0.93	0.68	0.42	0.60	37.3	5.6	42.9	2.74
Dry Fork	0.96	0.67	0.24	0.52	42.0	4.1	46.1	4.63
Mill Creek	0.86	0.74	0.51	0.64	30.4	11.8	42.2	1.74
Wiwaanaytt Creek	0.91	0.60	0.33	0.55	46.8	9.9	56.7	3.66
Summit Creek	0.87	0.66	0.49	0.61	35.1	12.0	47.1	1.94

*Header row: HEc: habitat effectiveness derived from the quality of cover; HEs: habitat effectiveness derived from the size and spacing of cover; HEr: habitat effectiveness derived from the density of roads open to vehicular traffic; HEI: overall habitat effectiveness index; percent S: satisfactory cover; percent M: marginal cover; percent total cover: percent satisfactory plus percent marginal cover. Note: in summer range, forage is not considered a limiting factor, therefore a forage value was not used in these calculations.

Proposed Action

Recreational driving and motorized public access to Austin planning area would benefit from road maintenance associated with restoration activities (219.10(a)(10)). Road maintenance on system roads used as haul routes would occur on approximately 574 miles of road within Austin planning area, including approximately 259 miles of stored roads. During management and road maintenance activities, stored roads may have their barriers removed or may be used by implementers for treatments. Existing roads used for haul that are currently contributing sediment to streams in Austin planning area would continue to do so, affecting streams,

associated riparian areas, and limiting opportunities for landscape scale restoration (219.8(a)(1)(vi), 219.8(a)(2), 219.8(a)(3), 219.8(a)(4)). Temporary roads may also be constructed to access certain areas. Stored roads would have barriers re-installed where they existed and temporary roads would be rehabilitated after use (see Austin Appendix C – Project Design Criteria). Impacts to the public would be minimal, as these are not part of the publicly accessible road system. However, impacts during project implementation could include, but are not limited to, reduced access to areas, increased noise, increased traffic, increased dust, and temporary disturbance to wildlife. Long-term, maintaining current open road density could result in reduced feelings of solitude, lower quality public hunting and wildlife viewing opportunities as more of the Forest is available for motorized access. Relocation of Crawford Creek road (National Forest System road 2620000) would result in minimal changes in snowmobile use, as associated trails would be realigned to relocated sections of the road.

Open road densities would continue to provide motorized recreation opportunities, cultural and traditional uses, administrative access, and general utilization of Forest resources as with the no action alternative (219.10(a)(1), 219.10(a)(3), and 219.10(a)(10)), although this amendment would result in a road system with a higher susceptibility of road failures. The amendment would also preclude us from being able to manage the road system for a variety of ecological attributes including quality wildlife habitat, stream function and processes, and road system sustainability and stability (219.10(a)(3)), resulting in potential adverse impacts to ecosystem integrity and diversity (219.9(a)(1), 219.9(a)(2), 219.9(a)(2)(i), 219.10(a)(1), 219.10(a)(7)).

Open road systems are a known vector for invasive species spread. This amendment would allow the existing high open road density in the Austin planning area to remain. Ongoing and continued invasive plant spread on open roads would perpetuate the decline of native species, including rare species currently known or suspected in the planning area (219.9(a)(2)(ii)).

Dry Fork and Wiwaanaytt subwatersheds would remain above open road density standards and below the minimum variable for habitat effectiveness standard derived from open road density. Wiwaanaytt subwatershed would fall below minimum standards for satisfactory cover; total cover percentage would be reduced to the forest plan standard; and cover in this subwatershed would shift from satisfactory to marginal. Bridge Creek subwatershed would remain at the forest plan standard for open road density and below habitat effectiveness standard derived from open road density.

Because there is no road storage associated with the proposed action, elk security would decrease as compared to the no action alternative due to removal of road storage barriers and increased motorized access on stored roads maintained or improved for haul. Existing barriers (such as berms) on stored roads would be removed for approximately 5 to 10 years until logging operations and associated haul actions are complete. Additionally, barriers on stored roads needed for noncommercial activities (for example, prescribed fire and noncommercial thinning) could be removed until activities are completed and permission and funding to replace the barriers are granted. Proposed road maintenance activities such as brushing roadside vegetation, blading roadbeds, cleaning ditches, and placing aggregate surfacing on previously inaccessible (grown in) or stored roads may encourage or increase motorized use. Approximately 43 miles of proposed temporary roads could increase motorized access in the short-term. All temporary roads would not be constructed at once and they would be rehabilitated after logging operations. However, temporary roads and roads improved for haul can be more difficult to effectively store

because of their visibility to forest users especially after vegetation, hazardous fuels treatments, and prescribed fire treatments reduce cover. This amendment would result in wildlife habitat that is not optimized to allow species to thrive in the face of disturbances, stressors, and other system drivers (219.8(a)(1)(iv) and 219.10(a)(8)).

A measurable benefit to elk distribution under the proposed action is unlikely. If existing barriers are replaced, elk security would move towards the existing condition of 4 percent again, well below the recommended 30 percent of the planning area to retain elk. Existing cover retained in old growth and connectivity and increases in forage quality and quantity from proposed vegetation treatments are not expected to increase elk distribution or retention on National Forest System lands within the planning area but may offer refugia cover. Some areas could recover cover sooner based on leave patches (skips) and variable density thinning prescriptions in addition to precipitation, elevation, aspect, soil types, and other factors. Elk would likely avoid areas of reduced total cover and higher road densities in the short-term until concealment cover grows back in the short- to midterm. Short- to mid-term negative impacts to elk distribution and displacement may occur for at least 10 years within the planning area due to the overall reduction in cover, higher open road density, and potential increased motorized use of stored roads. See the Wildlife Report for more information on the impacts to elk.

Proposed actions generally do not occur at the same time and implementation would occur incrementally over approximately 10 to 15 years. For example, commercial thinning treatments would not occur at the same time as prescribed fire or noncommercial treatments. However, there is potential to remove leave patches or skips that serve as cover when prescribed fire treatments follow mechanical treatments. Because proposed vegetation treatments would not occur simultaneously, satisfactory cover should remain throughout the planning area and offer hiding cover for elk but not at levels that would benefit elk distribution. Adequate concealment cover would likely be reached in 5 to 10 years as vegetation regrowth in the understory continues following mechanical vegetation treatments and prescribed fire.

Table 50. HEI, cover, and open road density standard followed by conditions post-treatment by subwatersheds.

Subwatershed	Hec*	HEs*	Her*	HEI*	Percent S*	Percent M*	Percent Total Cover*	Open Road Density miles/mile2
Malheur Forest Plan Standard	0.3	0.3	0.4	0.4	12	5	20	3.
Bridge Creek	0.76	0.74	0.37	0.57	15.6	14.6	30.1	3.2
Clear Creek	0.83	0.73	0.41	0.59	19.3	9.9	29.2	2.74
Dry Fork	0.81	0.7	0.35	0.56	15.0	9.4	24.3	4.63
Mill Creek	0.77	0.7	0.51	0.61	13.2	11.4	24.6	1.74
Wiwaanaytt Creek	0.68	0.62	0.34	0.52	7.2	12.8	20.0	3.66
Summit Creek	0.8	0.66	0.49	0.6	18.8	12.9	31.7	1.98

*Header row: HEc: habitat effectiveness derived from the quality of cover; HEs: habitat effectiveness derived from the size and spacing of cover; HEr: habitat effectiveness derived from the density of roads open to vehicular traffic; HEI: overall habitat effectiveness index; percent S: satisfactory cover; percent M: marginal cover; percent total cover: percent satisfactory plus percent marginal cover. Note: in summer range, forage is not considered a limiting factor, therefore a forage value was not used in these calculations.

For methods, road densities, and the full analysis of impacts to elk, see the management indicator species section for elk in the Wildlife Report.

Cumulative Effects

For the purpose of this analysis, cumulative effects focus on the impacts of maintaining current open road density and proposed activities when added to other on-going or reasonably foreseeable future actions within the planning area.

The area considered for cumulative effects to elk security habitat in Austin would be the planning area or Bridge Creek-Middle Fork John Day watershed and adjacent Camp Creek-Middle Fork John Day River and North Fork Burnt River watersheds. This is because these watersheds have ongoing projects and because elk have large home ranges and migrate out of Austin planning area into adjacent winter range. Winter range begins just southwest of Austin planning area and extends throughout John Day River valley. There is also winter range northeast into North Fork Burnt River watershed. Thus, potential cumulative effects could occur to individual elk with home ranges that overlap these watersheds or those migrating out of Austin planning area to winter range.

Past management activities including fire suppression, timber harvest, and grazing have contributed to current vegetation conditions of high fuel loading and greater potential for high-severity fires. Proposed activities would reduce canopy fuels, ladder fuels, and surface fuels, reducing potential for high-severity fire that could impact public access and quality of the recreation environment. In addition, wildfires can cause temporary road closures due to fire suppression efforts or public safety concerns post-wildfire. Maintaining the current open road density would allow for quicker response in the event of such a wildfire or other emergency, as well as providing ingress or egress to local communities in affected areas. Reducing the risk and likelihood of wildfire on the landscape has a long-term beneficial impact on both motorized public access and recreation opportunities, especially considered cumulatively with adjacent planning unit treatments.

The proposed action may have potential cumulative adverse effects on elk distribution because of the limited amount of existing elk security in the planning area, anticipated reduction in cover from proposed vegetation treatments, and assumption of increased motorized activities on stored roads improved for haul. When this is considered with: (1) past, ongoing, and future landscape level projects adjacent to Austin that are in winter range or that reduce cover following treatments; (2) potential for increased motorized access and high road densities in winter range (outside of Austin); and (3) increased recreation and motorized road use on Forest, it is likely that fewer elk would remain on National Forest System lands due to motorized use and other disturbances associated with high road densities.

Many of the stored roads in adjacent watersheds have lack effective barriers and wildlife benefits from that road storage have not been realized. Stored roads without effective barriers would likely continue to be used and would be additive to the open road density. Impacts of motorized use of stored roads without effective barriers would be additive to habitat loss, fragmentation, and behavioral responses associated with high road densities.

The 2008 Dad's Decision Notice and 2013 Galena Record of Decision have project areas that border the Austin planning area to the west and southwest (219.8(a)(1)(ii)). Open road densities in Dad's Project area were slightly above forest plan standards in winter range and were below or

within forest plan standards in summer range. The Environmental Assessment stated, "in dry biophysical environments, cover requirements may not be compatible with HRV. Historical conditions and fire return intervals favored large blocks of old forest single stratum with canopy closure too low to support large blocks of satisfactory or marginal cover. Under historical conditions, cover percentages would be inherently low..." (Dad's Creek Wildland Urban Interface Project 2008). However, historical range of variability does not look at other influencers of habitat such as growing outdoor recreation, roads, fences, technological advances in motorized vehicles, and others.

Under the Dad's Decision Notice, approximately 30 miles of stored roads were maintained and utilized for haul and to access treatment units. These roads were to be used temporarily until after project activities concluded. In addition, this project reduced satisfactory cover in winter range slightly below forest plan standards (total cover remained above forest plan standard). Impacts to big game distribution were anticipated in the short term, but timing restrictions of activities during winter, retaining unthinned patches, and open road densities remaining below forest plan standards were intended to mitigate impacts to cover. The status and efficacy of authorized road storage and barriers on existing stored roads in the Dad's project is currently unknown.

The 2013 Galena Project, adjacent to Austin, had 22 miles of roads authorized for storage and 37.2 miles of stored roads to be used for haul, then effectively stored again after completion of the project. Much of the proposed road storage was intended to offset the reduction in cover from other treatments in Galena. Habitat effectiveness increased due to anticipated interactions between increased forage and reduced open road densities to compensate for the reduction in cover. However, the status and efficacy of authorized road storage and barriers on existing stored roads in the Galena project is currently unknown. The Galena Record of Decision (page 25) stated, "Concerns have been raised concerning the effects of reducing satisfactory cover and the effectiveness of road closures as a mitigating factor for big game security. For the mitigation to be adequate to counter the loss of satisfactory cover, it will be necessary to have effective closures on roads identified to be closed. Roads that are not effectively closed would likely continue to be used and not provide security for big game. The Forest has lacked the effectiveness of closing roads and restricting unauthorized use in the past."

High open road densities and stored roads without effective barriers could increase the risk of invasive species infestations along roads. The Final Environmental Impact Statement for the 2015 Malheur National Forest Site-Specific Invasive Plants Treatment stated that high spread-potential occurs along roads. Vehicle traffic is considered the major vector for weed seeds since long stretches of roadways have invasive plants, and vehicles cover large distances picking-up and depositing seeds into new areas. The open light conditions inherent to roads create ideal habitat since most invasive plants on the Forest do not tolerate shade. Project design criteria (see Austin Appendix C – Project Design Criteria) and Forest-wide mechanisms to eradicate, control, contain, and suppress invasive plants are ongoing (219.9(a)(1) and 219.9(a)(2)). Invasive plants can adversely affect wildlife species by eliminating required habitat components; reducing available forage quantity or quality (Bedunah and Carpenter 1989; Rice et al. 1997; Trammell and Butler 1995); reducing preferred cover (Rawinski and Malecki 1984; Thompson et al., 1987); drastically altering habitat composition due to altered fire cycles (D'Antonio and Vitousek 1992; Mack 1981; Randall 1996; Whisenant 1990); and by causing physical injury, such as that resulting from long spines or "foxtails" (Archer 2001).

Overall, since elk are a game species and populations are generally stable across the Blue Mountains, cumulative impacts are expected to affect elk distribution in the planning area for a species commonly hunted, but not their population viability. Consequently, fewer elk would be available for public hunting, viewing, culturally significant foods, and general public enjoyment.

Site-Specificity

The proposed forest plan amendment is proposed to respond to the Grant County local community's need for motorized access and concerns about fire suppression and other emergency responses in the area. Given the aforementioned direction to defer travel management decisions that would decrease motorized public access, we worked closely with the Grant County Natural Resource Advisory Committee to address those concerns for this project.

Short-Term Deviation from Visual Quality Objective Standard of Retention

Based on need for change, site-specific conditions in Austin planning area, and relevant Malheur National Forest-specific information and data, the following substantive requirements of 36 Code of Federal Regulations 219.8 through 219.11 apply to the proposed amendment to allow for short-term deviation from the visual quality object standard of retention along sections of U.S. Highway 26 and Oregon Highway 7 within Austin planning area for the proposed action.

Direct and Indirect Effects

No Action Alternative

Direct and indirect effects result from the proposed action and thus are not germane to the no action alternative. Forest vegetation and other conditions that would result from taking no action are summarized below.

Under the no action alternative, there would be no removal of any trees within the planning area, other than activities that fall under previous decisions described in Austin Appendix D – Past, Ongoing, and Reasonably Foreseeable Actions. Without associated harvest activities, there would be no loss of scenic integrity or stability due to equipment corridors or other tethered logging practices. Winter shading treatments would not be completed within the visual corridor, resulting in no effects to visual quality objectives, but continued public safety concerns about black ice formation on those portions of the road.

The no action alternative would cause no immediate direct or indirect effects to existing conditions. Outcomes of the no action alternative are increased stand density, encroachment of less resilient species, increasing fuel loads, and high levels of mortality. This trend decreases overall resiliency of timber stands, causing scenic stability to decrease over time as conditions degrade.

Many existing scattered minor and moderate disturbances would be diminished through vegetative renewal over the next 10 years. However, potentially strong, and adverse indirect scenic disturbance effects could become increasingly more likely with no action since declines in fire-adapted vegetation and ecological resiliency would continue in future decades throughout the planning area. In the event of an uncharacteristically large wildfire, many desirable elements of Austin planning area's scenery would be lost for an extended period.

Proposed Action

Under the proposed action, approximately 3,382 acres of U.S. Highway 26 and Oregon Highway 7 visual corridor foreground with a visual quality objective of retention are proposed for commercial or noncommercial restoration treatment. Within this area, 868 acres could potentially be treated using skyline or tethered logging systems. Direct effects from these logging systems include potential views into cable corridors from the highway creating an unnatural line void of vegetation that would be an apparent change from the surrounding canopy. The length of time needed for these units to meet the retention visual quality objective depends upon whether skyline corridors are visible from the highways but could be greater than 5 years. Winter shading treatments in particular are in the immediate foreground of the U.S. Highway 26 viewshed and require use of tethered logging systems on the steep terrain. These treatments are proposed to help reduce black ice formation on the highway for public safety. For more information on effects to visuals, see Visuals section under Issues Considered for Analysis.

Cumulative Effects

Cumulative effects of this proposed forest plan amendment are addressed at the Forest-scale. The 1990 Malheur Forest Plan established 19 viewshed corridors covering an estimated 231,802 acres (USDA Forest Service 1990a, Appendix L). Since 1990, there has been one amendment that has affected the U.S. Highway 26 viewshed corridor (Olmstead Vegetative and Road Management Project) and none that have affected the State Highway 7 viewshed corridor. Olmstead Vegetative and Road Management Project (USDA Forest Service 2001) allowed loss of visual retention characteristics along Highway 26 within its analysis area effects were expected to recover by 2010 per the Olmstead analysis. With no direct or indirect effects from Austin activities and no remaining impacts from Olmstead, no cumulative effects are anticipated.

Site-Specificity

The proposed forest plan amendment is needed to address the need for change along U.S Highway 26 and Oregon Highway 7. Proposed restoration treatments are designed to move the landscape closer to historical range of variability and restore the landscape to a more historically fire-resilient condition. Deviating from the visual quality objective of stand retention would allow a greater number of trees to be removed from the area, increasing landscape resilience. Due to this high-travel area, man-made fires are more likely and could cause catastrophic wildfires. With higher tree removal and lower stand density, wildfires in these areas are more manageable.

Seedtree Harvest in U.S. Highway 26 Viewshed Middleground

Based on need for change, site-specific conditions in Austin planning area, and relevant Malheur National Forest-specific information and data, the following substantive requirements of 36 Code of Federal Regulations 219.8 through 219.11 apply to the proposed amendment to allow larger than 10-acre openings to be created within regeneration harvest treatment units within the middleground of U.S. Highway 26 viewshed.

Direct and Indirect Effects

No Action Alternative

Direct and indirect effects result from the proposed action and thus are not germane to the no action alternative. Forest vegetation and other conditions that would result from taking no action are summarized below.

Under the no action alternative, there would be no seedtree regeneration harvest requiring no creation of openings in the viewshed middle ground.

Proposed Action

Under the proposed action, approximately 136 acres of U.S. Highway 26 viewshed middleground with a visual quality objective of partial retention are proposed for seedtree regeneration harvest. This treatment has potential to create openings larger than the 10 acres allowed by Malheur Forest Plan. These units occur in overstocked mixed conifer stands that are directly adjacent to previous regeneration harvest units where early seral species have mostly died out due to competition stress. The goal would be to increase abundance of early seral species such as western larch, ponderosa pine, and western white pine through natural regeneration of these species and removal of late seral species which would improve ecological resiliency and move the landscape to a more fire-adapted ecosystem (consistent with 36 Code of Federal Regulations §219.8(a)(1)(iv), §219.8(a)(1)(v), §219.9(a)(1), §219.9(a)(2), §219.9(a)(2)(i), §219.9(a)(2)(iii), §219.10(a)(1), and §219.10(a)(8)). For more information on effects to visuals, see Visuals section under Issues Considered for Analysis.

Cumulative Effects

Cumulative effects of this proposed forest plan amendment are addressed at the Forest-scale and are the same as those anticipated for Short-Term Deviation from Visual Quality Objective Standard of Retention.

Site-Specificity

The proposed forest plan amendment is needed to address the need for change and the site-specific conditions in the planning area as described above. Proposed restoration treatments are designed to move the landscape closer to historical range of variability and restore the landscape to a more historically fire-resilient condition.

Other Required Disclosures

Culturally Significant Foods

The Malheur National Forest acknowledges the importance of culturally significant foods to our tribal partners. Foods such as water, fish (including salmon, lamprey, and trout), big game (including deer, elk, and pronghorn), and plants (including cous, bitterroot, camas, huckleberry, and chokecherry) are essential to sustain the subsistence and cultural needs of our tribal communities. These resources have sustained tribal people since time immemorial. The relationship between wildland food resources and Tribes is important to the preservation of their cultural identity.

Forested landscapes, like the Malheur National Forest, contain many diverse aquatic and terrestrial ecosystems. Culturally significant foods are distributed across these complex

landscapes. Prior to Euro-American settlement, Tribes managed these landscapes to promote production of wildland foods through various activities (such as pruning, burning, sowing seeds, and coppicing). One goal of large landscape-scale restoration projects, such as Austin Project, is to restore and maintain a healthy and resilient forest.

The Austin Project, through various actions, intends to maintain and improve a diverse forest composition, improve wildlife habitat, and improve aquatic resource conditions. Proposed restoration efforts should also improve production of and access to culturally significant foods within Austin planning area. The proposed actions do not directly target specific culturally significant food. The actions are intended to improve and restore processes and specific biotic and abiotic components of the various ecosystems within the project boundary. By focusing on these foundational elements, the Malheur National Forest anticipates that various resources including culturally significant foods would begin to increase in quality and density.

Climate Change

Climate change is a global phenomenon, because major greenhouse gases[32] mix well throughout the planet's lower atmosphere (IPCC 2013). Because local greenhouse gas emissions mix readily into the global pool of greenhouse gases, it is difficult and highly uncertain to ascertain the indirect effects of emissions from single or multiple projects of this size on global climate. At the global and national scales, this project's direct and indirect contribution to greenhouse gases and climate change would be negligible. Considering emissions of greenhouse gases in 2010 were estimated at 49 ± 4.5 gigatonnes[33] carbon dioxide (CO2) equivalent[34] globally (IPCC 2014) and 6.9 gigatonnes CO2 equivalent nationally (U.S. EPA 2015), the 76,000 acre Austin Project makes an extremely small contribution to overall emissions.

The proposed action would affect 76,000 acres of forest by commercially thinning forest stands and reducing surface fuels through prescribed fire. The Austin Project will retain a residual stand of about 70 percent of the original stand by basal area. This scope and degree of change would be minor, affecting roughly 4 percent of the 1.7 million acres of forested land on the Forest. The effect of proposed thinning and prescribed fire focuses on aboveground carbon stocks, which typically comprise a fraction of the total ecosystem carbon stocks in the proposed managed area; 50 percent or more of the ecosystem carbon is in the soils, a very stable and long-lived carbon pool (McKinley et al. 2011, Domke et al. 2017).

Because the direct and indirect effects would be negligible, the project's contribution to cumulative effects on global greenhouse gases and climate change would also be negligible. Carbon emissions during the implementation of the proposed actions would have only a momentary influence on atmospheric carbon concentrations because carbon will be removed from the atmosphere with time as the forest regrows, further minimizing or mitigating any potential effects.

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[32] Major greenhouse gases released as a result of human activity include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, and perfluorocarbons.

[33] Gigatonne is one billion metric tons: equal to about 2.2 trillion pounds.

[34] Equivalent CO_2 (CO_2e) is the concentration of CO_2 that would cause the same level of radiative forcing as a given type and concentration of greenhouse gases. Examples of such greenhouse gases are methane, perfluorocarbons, and nitrous oxide.

From 2000 to 2009, forestry and other land uses contributed just 12 percent of the human-caused global CO2 emissions[35]. The forestry sector's contribution to greenhouse gas emissions has declined over the last decade (IPCC 2014, Smith et al. 2014, FAOSTAT 2013). The largest source of greenhouse gas emissions in the forestry sector globally is deforestation (Pan et al. 2011, Houghton et al. 2012, IPCC 2014), which is defined as the removal of all trees to convert forested land to other land uses that do not support trees or allow trees to regrow for an indefinite period of time (IPCC 2000) (for example, conversion of forest land to agricultural or developed landscapes). However, forest land in the United States has had a net increase since the year 2000, and this trend is expected to continue for at least another decade (Wear et al. 2013, USDA Forest Service 2016a).

The Austin Project is not considered a major source of greenhouse gas emissions. Forested land would not be converted into a developed or agricultural condition or otherwise result in the loss of forested area. In fact, forest stands are being retained, thinned, and prescribed burned to mimic natural fire effects to maintain a vigorous condition that supports enhanced tree growth and productivity, thus contributing to long-term carbon uptake and storage.

Reducing stand density, part of the purpose and need of this project, is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Joyce et al. 2014). The proposed actions consistent with options proposed by the International Panel on Climate Change for minimizing the impacts of climate change on forests, thus meeting objectives for both adapting to climate change and mitigating greenhouse gas emissions (McKinley et al. 2011).

Forests have a "boom and bust" cycle with respect to carbon, as forests establish and grow, experience mortality with age or disturbances, and regrow over time. Forest management activities such as harvests and hazardous fuels reduction have characteristics similar to disturbances that reduce stand density and promote regrowth through thinning and removal, making stands and carbon stores more resilient to environmental change (McKinley et al. 2011).

The relatively small quantity of carbon released to the atmosphere and the short-term nature of the effect of the proposed action on the forest ecosystem are justified, given 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). Furthermore, any initial carbon emissions from the proposed action would be balanced and possibly eliminated as the stand recovers and regenerates, because the remaining trees and newly established trees typically have higher rates of growth and carbon storage (Hurteau and North 2009, Dwyer et al. 2010, McKinley et al. 2011).

In the absence of commercial thinning, the Austin planning area will thin naturally from mortality-inducing natural disturbances and other processes resulting in dead trees that will decay over time, emitting carbon to the atmosphere. Conversely, the wood and fiber removed from the forest in this proposed action will be transferred to the forest products sector for a variety of uses, each of which has different effects on carbon (Skog et al. 2014).

[35] Fluxes from forestry and other land use activities are dominated by CO_2 emissions. Non-CO_2 greenhouse gas emissions from forestry and other land use activities are small and mostly due to peat degradation releasing methane and were not included in this estimate.

Carbon can be stored in forest products for a variable length of time, depending on the commodity produced. It can also be burned to produce heat or electrical energy or converted to liquid transportation fuels and chemicals that would otherwise come from fossil fuels. A substitution effect occurs when forest products are used in place of other products that emit more greenhouse gases in manufacturing, such as concrete and steel (Gustavsson et al. 2006, Lippke et al. 2011, McKinley et al. 2011). Removing carbon from forests for human use can result in a lower net contribution of greenhouse gases to the atmosphere than if the forest were not managed (McKinley et al. 2011, Bergman et al. 2014, Skog et al. 2014).

The Intergovernmental Panel on Climate Change (ICCP) recognizes wood and fiber as a renewable resource that can provide lasting climate-related mitigation benefits that can increase over time with active management (IPCC 2000). 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 greenhouse gas emissions.

In the absence of prescribed fire to reduce stand density and fuel loads may be more at risk to a high-severity wildfire, resulting in decreased ecosystem services and potentially increased carbon emissions. Prescribed fires typically target surface and ladder fuels and are typically less severe than wildfires (Agee and Skinner 2005), because they are conducted only when weather conditions are optimal and fuel moisture is high enough to keep combustion and spread within predetermined limits.

Thus, prescribed fires result in minimal overstory tree mortality and typically combust less than 50 percent of the available fuel (Carter and Foster 2004, Hurteau and North 2009), producing lower greenhouse gas emissions than might be emitted if the same area were to burn in a high-severity wildfire (Wiedinmyer and Hurteau 2010). Also, a large portion of the emissions associated with prescribed fires are from duff, litter, and dead wood which comprise carbon pools that would otherwise decay quickly over time, releasing carbon to the atmosphere.

Hazardous fuels reduction and restoration treatments can help reduce the severity of wildfires in forests where fire exclusion has resulted in high fuel loadings and high tree densities (Agee and Skinner 2005, Stephens et al. 2013). High-severity fires, especially when they occur repeatedly, can affect human health and safety, infrastructure, and ecosystem services, and can cause a transition of forests to non-forest ecosystems in some areas (Roccaforte et al. 2012, Anderson-Teixeira et al. 2013). By reducing the threat of high-severity wildfire, the proposed action would create conditions more advantageous for supporting forest health in a changing climate and reducing greenhouse gas emissions over the long-term.

The proposed action would affect a relatively small amount of forest land and carbon on the Forest and, in the near term, might contribute an extremely small quantity of greenhouse gas emissions relative to national and global emissions. The proposed action would not convert forest land to other non-forest uses, thus allowing any carbon initially emitted from the action alternatives to have a temporary influence on atmospheric greenhouse gas concentrations, because carbon will be removed from the atmosphere over time as the forest regrows and will transfer carbon to the product sector where it may be stored for decades and substitute for more emission intensive materials or fuels. The proposed action is consistent with internationally recognized climate change adaptation and mitigation practices.

Tribal Engagement and Other Consultation

Many laws, regulations, and directives instruct the Forest Service to consult with American Indian Tribes, the State, and other interested parties on cultural resource management issues. This consultation is ongoing through the National Environmental Policy Act process and under the terms of existing agreements with American Indian Tribes. Austin pre-scoping and scoping information were shared with the Tribes.

Given the nature of the proposal, the responsible official consulted the following agencies, organizations, tribes, and persons during development and analysis of the proposal:

Federal, State, and Local Agencies

- Blue Mountains Forest Partners
- Grant County Court
- Grant County Natural Resource Advisory Committee
- Oregon State Historic Preservation Office
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of the Interior, Office of Environmental Policy and Compliance
- U.S. Environmental Protection Agency

Tribes

- Burns Paiute Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs

Additionally, approximately 250 additional individuals or organizations were notified of the availability of the draft environmental impact statement on the Forest's webpage and through letter or email.

Public Involvement

Purpose and need and proposed action were developed through a collaborative process involving the public, Blue Mountains Forest Partners collaborative group, and the Forest staff. Beginning in summer of 2017, field trips and meetings were held to discuss existing and desired conditions of Austin planning area, and potential activities to achieve those desired conditions.

The notice of intent was published in the Federal Register on July 18, 2019 (84 FR 32401). The notice of intent asked for public comment on the proposal from July 18 through August 7, 2019. In addition, as part of the public involvement process, the agency issued a news release on July 8, 2019, published a legal notice in the Blue Mountain Eagle on July 10, 2019, made a presentation to Grant County Court on July 24, 2019, and held a public open house on July 30, 2019.

In response to scoping comments the Forest Service received, and additional ongoing work on the project since 2019, the Malheur and Wallowa-Whitman National Forests initiated an additional 30-day scoping period updating the project timeline and identifying the substantive provisions for additional potential forest plan amendments to Malheur Forest Plan. The Forest Service published an additional notice of intent to prepare an environmental impact statement for the Austin Project in the Federal Register on May 15, 2025. (84 FR 32401).

Due to the critical and time-sensitive nature of the proposed actions, the Responsible Official is using an emergency authority to expedite implementation of all or portions of this project. While we recognize that expediting implementation reduces one last opportunity for formal public involvement prior to a final decision, we are also aware of the urgency to implement some or all of these actions starting in 2026. Our intent is to focus use of these authorities on the most urgent actions in the highest-priority areas while allowing for public input prior to final decisions and implementation.

Forest Service responses to comment letters received during the 2019 scoping period and the 2025 scoping period, and public meeting notes can be found in the project record.

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