United States Department of Agriculture

# Magone Project

## Draft Environmental Impact Statement

Forest Service Malheur National Forests Blue Mountain Ranger District Jan 2016

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# Magone Project
# Draft
# Environmental Impact Statement
# Grant County, Oregon


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**Abstract:** A draft environmental impact statement (EIS) has been prepared for the Magone Project to analyze alternatives for implementation of silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities. Project activities are proposed on National Forest System lands on the Malheur National Forest, Blue Mountain Ranger District in Grant County, Oregon. Three action alternatives have been developed based on public input and collaborative efforts. **Alternative 1** is the "no action" alternative. **Alternative 2**, the proposed action, includes silviculture treatments, prescribed burning, recreation opportunity improvements, Magone Lake restoration activities, and road activities; alternative 2 is the preferred alternative. **Alternative 3** is a modification of the proposed action, developed to respond to comments generally requesting more activities. This alternative includes more acres of silviculture treatments, leaves more road segments open, and includes more miles of hiking/bicycle trails. **Alternative 4** is a modification of the proposed action, developed to respond to comments generally requesting fewer activities. This alternative includes fewer acres of silviculture treatments, less acres of prescribed burning in the Nipple Butte Inventoried Roadless Area, fewer miles of hiking/bicycle trails, fewer fish cribs and fish sticks to be placed into Magone Lake, and leaves more road segments open.


It is important that reviewers provide their comments at such times and in such a way that they are useful to the agency's preparation of the final EIS. Therefore, comments should be provided prior to the close of the comment period and should clearly articulate the reviewer's concerns and contentions. The submission of timely and specific comments can affect a reviewer's ability to participate in subsequent administrative review or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews.

| | |
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| **Send Comments to:** | **Blue Mountain Ranger District**<br>**c/o Sasha Fertig**<br>**P.O. Box 909**<br>**John Day, OR 97845** |

# Acronyms

| | |
|---|---|
| ARBO | Aquatic Restoration Biological Opinion |
| BMFP | Blue Mountain Forest Partners |
| BMP | best management practices |
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| CWD | coarse woody debris |
| DBH | diameter at breast height |
| DEIS | draft environmental impact statement |
| DecAID | decayed wood advisor |
| DOG | dedicated old growth |
| EA | environmental assessment |
| EIS | environmental impact statement |
| FM | fuel model |
| FSH | Forest Service Handbook |
| FSM | Forest Service Manual |
| FSR | Forest Service road |
| GIS | geographic information system |
| HEI | habitat effectiveness index |
| HRV | historical range of variability |
| IRA | inventoried roadless area |
| LOS | late and old structure |
| LWD | large woody debris |
| SEOC | stem exclusion open canopy |
| SI | stand initiation |
| SOPA | Schedule Of Proposed Actions |
| TES | threatened, endangered and sensitive (species) |
| TMDL | total maximum daily load |
| UF | upland forest |
| MA | management area |
| Max SDI | maximum stand density index |
| MCR | Mid-Columbia River |
| MIS | management indicator species |
| ML | maintenance level |
| MOU | memorandum of understanding |
| MZ | management zone |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| OFMS | old forest multi strata |
| OFSS | old forest single stratum |
| PAG | plant association group |
| PCE | primary cavity excavators |
| PDC | project design criteria |
| PETS | proposed, endangered, threatened and sensitive (species) |
| PFA | post-fledging area |
| PWA | potential wilderness area |
| PWFA | pileated woodpecker feeding area |
| RHCA | riparian habitat conservation area |
| RMO | riparian management objective |
| ROD | record of decision |
| ROG | replacement old growth |
| ROS | recreation opportunity spectrum |
| SDI | stand density index |
| SECC | stem exclusion closed canopy |
| UR | understory reinitiation |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| VQO | visual quality objective |
| WHT | wildlife habitat types |
| WUI | wildland urban interface |
| YFMS | young forest multi strata |

# Summary

The Malheur National Forest proposes to implement silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities as part of the Magone Project. The area affected by the proposal includes approximately 27,000 acres in the Grub Creek and East Fork Beech Creek subwatersheds that drain into the Upper John Day River. The Magone Project is located on the Blue Mountain Ranger District within the Malheur National Forest and is located in Grant County approximately 7 miles north of the town of John Day, Oregon. The legal description for the project planning area is (township, range, and sections):

- Township 11 South, Range 31 East, sections 25–29, 32–36;
- T. 11 S., R. 32 E., sec. 30–32;
- T. 12 S., R. 31 E., sec. 1–5, 8–12, 13–15, 17–24;
- T. 12 S., R. 32 E., sec., 5–11, 15–20, Willamette Meridian.

Four alternatives are analyzed in detail and presented in this draft environmental impact statement (DEIS). A general summary of the DEIS is presented here, including a brief description of the project planning area, purpose and need, major issues, and the alternatives. Additionally, more detailed information is presented in chapters 1 through 3 of this DEIS and in specialist reports located in the project record located at the Blue Mountain Ranger District Office.

## Purpose and Need for Action

The purpose and need for the Magone Project was developed by comparing the management objectives and desired conditions in the Malheur Forest Plan to the existing conditions in the project planning area related to forest resiliency and function. Where plan information was not explicit, best available science and local research were utilized in a collaborative setting with stakeholders.

The overall purpose of this project is to restore forest resiliency by reestablishing and restoring forest structure and pattern, vegetation composition and diversity, and riparian communities to conditions that are more resilient to natural disturbance processes, including wildfire. Comparison of the existing and desired future condition indicates the specific needs to:

- Restore forest structure, composition, and density toward more resistant and resilient vegetative conditions given the historical fire regime.
- Reduce the fuel loadings, including the density and horizontal and vertical connectivity of standing vegetation, surface fuels, and/or ladder fuels to restore characteristics of ecosystem composition and structure to reduce uncharacteristic wildfire effects within the project planning area including the Nipple Butte Inventoried Roadless Area (IRA) and wildland urban interface (WUI). Reduce fuels along County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan.
- Maintain or improve habitat for fish and wildlife species present in the project planning area.
- Improve one or more of the nine roadless area characteristics (as defined by the 2001 Roadless Area Conservation Rule) within the Nipple Butte IRA.
- Provide for a variety of social values and opportunities in the watershed, including availability of traditional use plants (including huckleberries), a variety of wood products (including merchantable sawtimber and post and poles), grazing, enhanced recreation experiences around Magone Lake, and forest management employment opportunities to help maintain and improve community stability and infrastructure, recreational opportunities, and a safe road system that moves toward current public access and resource management objectives.

See Chapter 1, Purpose and Need section for more details regarding the existing versus desired future condition.

## Public Involvement

The proposed action and other action alternatives were developed through a collaborative process involving the public, the Blue Mountain Forest Partners (BMFP) collaborative, and Malheur National Forest staff. Beginning in the summer of 2014, fieldtrips and meetings were held with collaborators to discuss the existing and desired conditions of the project planning area, and a potential suite of activities to achieve those desired conditions.

On June 18, 2014, BMFP and Malheur National Forest staff visited sites within the Nipple Butte Inventoried Roadless Area (IRA) in the Magone project planning area. Site visits within the IRA included discussions on fir and juniper encroachment, wildlife habitat improvement, forest densities, ladder fuels, fire starts, potential silviculture treatments, and natural ignition.

On July 16, 2014, Blue Mountain Forest Partners and Malheur National Forest staff visited sites around the Magone Lake recreation area. Discussion topics at the sites visited included aesthetics and visuals, fir encroachment, safety corridors, trail improvements, fuel breaks, ladder fuels, cool moist pockets, and recreation site management versus lake management.

In September 2014, the Forest Service interdisciplinary team for the Magone Project presented resource stories on the existing condition of the project planning area to the Blue Mountain Forest Partners collaborative at their regular monthly meeting. The resource stories served as a baseline for developing proposed treatments. These same resource stories were also presented at a public open house meeting on September 24, 2014. Stakeholders of the project planning area were invited to attend and an article was published in the Blue Mountain Eagle on August 27, 2014, to announce the meeting to local interested public. In addition, flyers were circulated at the Magone Campground in the summer and fall and there was a radio spot on the radio station KJDY where the District Ranger shared information about the planning process for the Magone Project. The extended and more detailed versions of the Magone Project resource stories can be found online: https://www.youtube.com/playlist?list=PL6ZBnsdnJddrU7TNXorZsK844YMjK6JgL.

The Magone Project was listed in the Malheur National Forest Schedule of Proposed Actions (SOPA) beginning in October 2014, and has been listed in all subsequent quarterly SOPAs. This document is mailed to individuals and is available on the internet (http://www.fs.fed.us/sopa/forest-level.php?110604) for those who are interested in activities proposed on the Malheur National Forest.

The Notice of Intent (NOI) to prepare an environmental impact statement was published in the Federal Register on February 13, 2015. This notice initiated the 30-day scoping period. A legal notice was also published in the Blue Mountain Eagle on February 11, 2015, providing notification of the Magone Project scoping period. A scoping package was sent to approximately 150 individuals, groups, federal and state agencies at the same time the scoping notice was published. Twenty-six (26) comments were received in response within the 30-day scoping period. The legal notice, letters, a radio spot on the local KJDY radio station, and the Forest's website included an invitation to a public meeting on February 24, 2015, which approximately 25 people attended. The Forest Service response to the comment letters received during the scoping period can be found in Appendix D – Scoping Report, and public meeting notes can be found in the project record.

On April 15, 2015, BMFP and Malheur National Forest staff visited sites within the Nipple Butte IRA. Site visits within the IRA included discussions on prescribed burning and removing conifers and juniper that are encroaching upon and shading out mountain mahogany and other upland shrubs. Another fieldtrip stop looked at a stand proposed to be moved from dedicated old growth to replacement old growth designation, with thinning to create variable density and to help move the stand toward old growth characteristics.

# Key Issues

Key issues are those that represent a point of debate or concern that cannot be resolved without consideration of the trade-offs involved. These issues spur the design of alternatives to the proposed action that provide a different path to achieve project objectives. Trade-offs can be more clearly understood by developing alternatives and displaying the relative impacts of these alternatives weighed against the proposed action.

**Level and effects of silviculture treatments** – A wide variety of comments were received on the topic of silviculture treatments and prescribed burning, some requesting that the Forest Service analyze an alternative that includes more commercial harvest and some requesting an alternative with less commercial harvest and prescribed burning. Measures: percentage change of structural stages in relation to the historical range of variability (HRV); percentage change of acres above the management zone (MZ), within the MZ, and below the MZ as defined by maximum stand density index (MaxSDI); acres mechanically treated; viability of harvest; employment and income; and economic efficiency; and million board feet (MMBF) harvested.

**Recreation developments** – A wide variety of comments were received on the topic of the level, type, and location of recreation development. Some individuals were in favor or opposed to bicycle trail developments and changes to the Magone Lake Recreation Area. Measures: impacts to recreation opportunity spectrum (ROS) classes, recreation opportunities, and public access to recreation.

**Impacts to the Nipple Butte Inventoried Roadless Area (IRA)** – Some comments were received requesting more active management within the Nipple Butte IRA, while others requested less or no silviculture treatments, prescribed burning, or other project activities occur within the Nipple Butte IRA. Measures: impacts to roadless area characteristics, acres and type of silviculture treatments, acres and type of prescribed burning, miles of hiking/bicycle trails within the Nipple Butte IRA.

# Alternatives Considered in Detail

The key issues described above led the agency to develop two action alternatives to the proposed action, for a total of four alternatives.

## Alternative 1 (no action)

The ‘no action alternative’ is required by the National Environmental Policy Act (NEPA). Under the no action alternative, no management activities proposed in any of the other alternatives would occur. Alternative 1 is designed to represent the existing condition and is analyzed for projected future conditions if no activities proposed in any of the alternatives are authorized. It serves as the baseline to compare and describe the differences and effects between taking no action and implementing one of the other alternatives.

## Alternative 2 (proposed action)

Alternative 2 is the proposed action and preferred alternative, which responds to the need to restore forest resiliency by reestablishing and restoring forest structure and pattern, vegetation composition and diversity, and riparian communities to conditions that are more resilient to natural disturbance processes. Alternative 2 would authorize activities in five categories: silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities. This alternative also includes a Forest Plan amendment to change dedicated old growth boundaries and to reduce Summer Range, Winter Range, and Wildlife Emphasis Area Cover below Malheur Forest Plan standards. More detailed descriptions are found in Chapter 2; a table showing each silviculture unit, haul routes, temporary road construction, and road system changes can be found in Appendix A – Project Activity Tables; and maps of the project activities can be found in Appendix B – Maps.

## Alternative 3

Alternative 3 was developed in response to the key issues, to address comments generally requesting more project activities. Alternative 3 would authorize activities in five categories: silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities. Compared to alternative 2, alternative 3 would include 1,506 more acres of silviculture treatments, prescribed burning within most of the Nipple Butte IRA would be fall only ignition, 4.4 more miles of temporary road construction, 20.8 more miles of road maintenance, 2.2 fewer miles of road closures, 42.3 more miles of new hiking/bicycle trails, construction of an additional trailhead, addition of OHV use designated on FSR 36 to Four Corners. This alternative also includes a Forest Plan amendment to change dedicated old growth boundaries and to reduce Summer Range, Winter Range, and Wildlife Emphasis Area Cover below Malheur Forest Plan standards. More detailed descriptions are found in Chapter 2; a table showing each silviculture unit, haul routes, temporary road construction, and road system changes can be found in Appendix A – Project Activity Tables; and maps of the project activities can be found in Appendix B – Maps.

## Alternative 4

Alternative 4 was developed in response to the key issues, to address comments generally requesting fewer project activities. Alternative 4 would authorize activities in five categories: silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities. Compared to alternative 2, alternative 4 would include 6,367 fewere acres of silviculture treatments, 11,300 fewer acres of prescribed burning (primarily within the Nipple Butte IRA), 0.4 less miles of temporary road construction, 0.5 less miles of road maintenance, 2.2 less miles of road closures, 38.6 less miles of new hiking/bicycle trails, no new trailhead at Four Corners, no new interpretive signs, and fewer fish cribs and sticks placed in Magone Lake. This alternative also includes a Forest Plan amendment to change dedicated old growth boundaries. More detailed descriptions are found in Chapter 2; a table showing each silviculture unit, haul routes, temporary road construction, and road system changes can be found in Appendix A – Project Activity Tables; and maps of the project activities can be found in Appendix B – Maps.

**Comparison of project elements between alternatives**

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Silviculture treatments** | | | | |
| silviculture treatments | -- | 11,872 acres<br>283 units | 13,378 acres<br>348 units | 5,505 acres<br>152 units |
| commercial harvest<br>**Included within silviculture treatment acres* | -- | 4,686 acres<br>101 units | 7,184 acres<br>164 units | 3,570 acres<br>92 units |
| estimated volume (million board feet [mmbf]) | -- | 14 MMBF | 16 MMBF | 9 MMBF |
| **Prescribed burning** | | | | |
| prescribed burning (planned ignitions in spring or fall) | -- | 28,500 acres | 28,500 acres<br>**11,300 acres in the Nipple Butte IRA would be fall only planned ignitions.* | 17,200 acres |
| **Recreation opportunity improvements** | | | | |
| new trails | -- | 54.0 miles | 96.3 miles | 15.4 miles |
| existing trails to un-designate | -- | 3.9 miles | 3.9 miles | 3.9 miles |
| accessible trail development | -- | Make existing trail from campground to north end of lake ADA accessible (approximately 0.2 miles of trail improvement). Develop a new day use site on north side of lake (at the end of this trail improvement) with picnic table and interpretive sign. | Make existing trail from campground to north end of lake A accessible (approximately 0.2 miles of trail improvement). Develop a new day use site on north side of lake (at the end of this trail improvement) with picnic table and interpretive sign. | No developments |
| trailhead developments | -- | Improve existing Nipple Butte and Lake Butte trailheads.<br>Construct new trailhead at Four Corners. | Improve existing Nipple Butte and Lake Butte trailheads.<br>Construct new trailhead at Four Corners and near junction of FSR 3618-064 and 3618-125 (Tinker Creek trailhead). | Improve existing Nipple Butte and Lake Butte trailheads. |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| interpretive signs | -- | Place interpretive signs:<br>• Along Slide Trail about the slide the created Magone Lake.<br>• East side of Magone Lake about the slide that created Magone Lake.<br>• Four Corners about fire, heritage, range, and vegetation types in the area.<br>North side of Magone Lake about beaver activity. | Place interpretive signs:<br>• Along Slide Trail about the slide the created Magone Lake.<br>• East side of Magone Lake about the slide that created Magone Lake.<br>• Four Corners about fire, heritage, range, and vegetation types in the area.<br>North side of Magone Lake about beaver activity. | No new interpretive signs. |
| day use boat dock (southwest corner of lake) | -- | Modify existing to be more function and with a more rustic appearance | Modify existing to be more function and with a more rustic appearance | Modify existing to be more function and with a more rustic appearance |
| campground boat mooring (northwest corner of lake) | -- | Replace with handicap accessible boat mooring | Replace with handicap accessible boat mooring | Replace with handicap accessible boat mooring |
| fishing dock (east side of lake) | -- | Place new fishing dock along east side of lake | Place new fishing dock along east side of lake | -- |
| OHV use | -- | -- | OHV use designated on FSR 36 to 4 Corners. | -- |
| **Magone Lake restoration activities** | | | | |
| fish cribs | -- | Place 15-20 fish cribs throughout lake | Place 15-20 fish cribs throughout lake | Place 5-10 fish cribs in 2 clusters |
| fish sticks | -- | Place 70-100 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH | Place 70-100 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH | Place 40-70 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Road activities** | | | | |
| miles of temporary road construction | -- | 8.5 miles<br>29 road segments | 12.9 miles<br>49 road segments | 8.1 miles<br>28 road segments |
| road maintenance for haul | -- | 77.7 miles<br>78 road segments | 98.5 miles<br>105 road segments | 77.2 miles<br>77 road segments |
| miles of new road closures | -- | 1.1 miles<br>4 road segments | 0.3 miles<br>2 road segments | 0.3 miles<br>2 road segments |
| close currently open road and co-designate as a trail and ML 1 road | -- | 1.4 miles<br>2 road segments | -- | -- |
| convert closed road to trail | -- | 1.2 miles<br>1 road segment | -- | -- |
| *co-designate existing road as a trail (this activity would not change existing open road system)* | -- | *4 miles*<br>*8 road segments* | *9.5 miles*<br>*15 road segments* | *1.3 miles*<br>*3 road segments* |
| miles of road decommissioning | -- | 0.3 miles<br>1 road segment | 0.3 mile<br>1 road segment | 0.3 mile<br>1 road segment |

# Summary of Key Effects by Alternative

Key issues are those that represent a point of debate or concern that cannot be resolved without consideration of the trade-offs involved. These issues spur the design of alternatives to the proposed action that provide a different path to achieve project objectives. Trade-offs can be more clearly understood by developing alternatives and displaying the relative impacts of these alternatives weighed against the proposed action. The key effects identified for the Magone Project are:

- Level and effects of silviculture treatments
- Recreation developments
- Impacts to the Nipple Butte Inventoried Roadless Area (IRA)

See the table below for a comparison of effects between the alternatives.

**Comparison of key effects by alternative**

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Level and effects of silviculture treatments** | | | | |
| Percentage change of structural stages in relation to the historical range of variability (HRV) | *Warm Dry plant association group (PAG)* – old forest multi strata (OFMS) would continue to be above HRV, after 40 years the PAG would be deficient in young forest structure (stand initiation [SI]) decreasing to the lower limit of young forest multi strata (YFMS) and just attaining the lower limit of old forest single stratum (OFSS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). |
| | *Hot Dry PAG* – Currently, OFSS is below HRV. While it is projected to increase, the model does not have it increasing to within the historic range in 40 years. Young forest and SI are modeled to decrease over time. Stem exclusion open canopy (SEOC) stands move toward HRV, but are still well above HRV. | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, after 40 years the PAG would be deficient in YFMS structure, SI structure would increase, and SEOC structure would decrease to be closer to HRV. | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be close to HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). |
| | *Cool Moist PAG* – Currently, OFSS is slightly higher than HRV. Over time, the model has OFSS moving in and out of HRV. OFMS, however exceeds HRV, and keeps increasing over time. The younger strata decrease over time, with YFMS and understory reinitiation (UR) moving below HRV. | *Cool Moist PAG* – OFMS would continue to be above HRV (although it does decrease slightly over 40 years), OFSS would increase to be well above HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Cool Moist PAG* – OFMS would continue to be above HRV (although it does decrease slightly over 40 years), OFSS would increase to be well above HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Cool Moist PAG* – OFMS would continue to be above HRV, OFSS would increase to be well above HRV, after 40 years the PAG would be deficient in YFMS and UR, and SI would be within HRV (but stay on the lower side of the range). |
| | *Cold Dry PAG* – The structures represented in this PAG represent a small portion of the planning area. The overall trend of Old Forest structure is to increase above HRV, at the same time most of the other structure classes are moving into, or closer to the historical levels. | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, after 40 years the PAG be deficient in YFMS, and SI would increase and stay within HRV. | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly over time and stay within HRV. |
| | *Warm Moist PAG* – This PAG makes up a small portion of the project planning | *Warm Moist PAG* – OFMS would rise to be above HRV, | *Warm Moist PAG* – OFMS would stay static, OFSS would | *Warm Moist PAG* – OFMS would rise above HRV, |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | area. While currently the Old Forest structure classes are within HRV, modeling shows those structure classes increasing to double and triple HRV, and younger forest structure classes going below HRV. | OFSS would increase to slightly above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly (but stay on the lower end of HRV). | increase to above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly (but stay on the lower end of HRV). | OFSS would increase above HRV, and after 40 years the PAG would be deficient in YFMS and SI. |
| Percentage change of acres above the management zone (MZ), within the MZ, and below the MZ in 40 years as defined by maximum stand density index (MaxSDI) | *Warm Dry PAG* – 96% above the MZ, 3% within the MZ<br>*Hot Dry PAG* – 78% above the MZ, 6% within the MZ<br>*Cool Moist PAG* – 99% above the MZ, 0% within the MZ<br>*Cold Dry PAG* – >99% above the MZ, 1% within the MZ<br>*Warm Moist PAG* – 96% above the MZ, 3% within the MZ | *Warm Dry PAG* – 69% above the MZ, 17% within the MZ<br>*Hot Dry PAG* – 50% above the MZ, 18% within the MZ<br>*Cool Moist PAG* – 68% above the MZ, 9% within the MZ<br>*Cold Dry PAG* – 65% above the MZ, 15% within the MZ<br>*Warm Moist PAG* – 74% above the MZ, 11% within the MZ | *Warm Dry PAG* – 59% above the MZ, 20% within the MZ<br>*Hot Dry PAG* – 48% above the MZ, 19% within the MZ<br>*Cool Moist PAG* – 54% above the MZ, 7% within the MZ<br>*Cold Dry PAG* – 58% above the MZ, 23% within the MZ<br>*Warm Moist PAG* – 62% above the MZ, 12% within the MZ | *Warm Dry PAG* – 81% above the MZ, 10% within the MZ<br>*Hot Dry PAG* – 74% above the MZ, 9% within the MZ<br>*Cool Moist PAG* – 87% above the MZ, 3% within the MZ<br>*Cold Dry PAG* – 74% above the MZ, 8% within the MZ<br>*Warm Moist PAG* – 83% above the MZ, 7% within the MZ |
| Acres mechanically treated | 0 acres | 11,872 acres | 13,378 acres | 5,505 acres |
| Viability of harvest | N/A | Commercial harvest shows positive bid rates producing a viable harvest, $371,501 is the estimated revenue from the sale. | Commercial harvest shows positive bid rates producing a viable harvest, $455,258 is the estimated revenue from the sale. | Commercial harvest shows positive bid rates producing a viable harvest, $251,644 is the estimated revenue from the sale. |
| 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. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (107 jobs) would occur for 2 years.<br>This alternative would generate $2,987,505 in direct, indirect, and induced local income. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (164 jobs) would occur for 2 years.<br>This alternative would generate $4,580,008 in direct, indirect, and induced local income. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (82 jobs) would occur for 2 years.<br>This alternative would generate $2,275,992 in direct, indirect, and induced local income. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Economic efficiency | The public would incur no costs, nor realize any benefits. | A present net value of $-292,092, with a net value per acre of $-62 would be experienced this alternative. | A present net value of $-189,035, with a net value per acre of $-26 would be experienced this alternative. | A present net value of $-153,352, with a net value per acre of $-43 would be experienced this alternative. |
| Estimated volume (million board feet [mmbf]) | -- | 14 MMBF | 16 MMBF | 9 MMBF |
| **Recreation developments** | | | | |
| Recreation opportunity spectrum (ROS) | Area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. | The proposed actions are intended to enhance the visitor experience by improving and creating recreation opportunities that are compatible with the ROS and consistent with the Malheur Forest Plan. The area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. | | |
| Recreation opportunities | The no action alternative would perpetuate existing conditions in the Magone project planning area. Attractive mountain biking opportunities would continue to be nonexistent, as the trails on roads that currently exist were designed for vehicles, not bicycles. The fishing and boating opportunities at Magone Lake would not be improved. | Silviculture (11,872 acres) and prescribed burning treatments (up to 28,500 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 48.8 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and a new trailhead at Four Corners. | Silviculture (13,378 acres) and prescribed burning treatments (up to 28,500 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 92.4 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and new trailheads near the junction of FSR 3618-064 and 3618-025 and at Four Corners. | Silviculture (5,505 acres) and prescribed burning treatments (up to 17,200 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities, although less than experienced under alternatives 2 and 3 due to a smaller number of fish sticks and logs being placed.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 11.9 miles of new trail, and improvements to the Tinker Creek trailhead and the |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | | | Nipple Butte trailhead and its access road |
| Public access to recreation | Recreational use of forest roads would not be immediately affected, as there would not be any changes to the existing road system.<br>The continued buildup of fuel loads along escape corridors from the Magone Lake recreation area would have the indirect effect of decreasing safety in the Magone Lake recreation area by increasing the risk of uncharacteristic fire along these routes. | Recreational use of forest roads would be minimally affected with 2.5 miles of road being closed and 0.3 miles of road being decommissioned.<br>Recreational driving would benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest. | Recreational use of forest roads would be minimally affected with 0.3 miles of road being closed and 0.3 miles of road being decommissioned.<br>Recreational driving would benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest. | |
| **Impacts to the Nipple Butte Inventoried Roadless Area** | | | | |
| Effects on nine characteristics of inventoried roadless areas (IRAs) | There would be no direct or indirect effects to the Nipple Butte IRA because no activities would occur. The existing condition would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. Growth rates of trees would continue to decline, and natural processes that affect tree vigor and changes in stand structure would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within forest stands, which would result in larger acreages of blackened landscapes compared to prescribed fires. Fire is a natural occurrence and expected disturbance process in this landscape. | *High quality or undisturbed soil, water, and air* – Alternative 2 is likely to result in the most detrimentally affected soils and effects to site productivity from disturbance related to approximately 3,660 acres of commercial and non-commercial thinning, and construction of approximately 19 miles of new trail. Detrimental impacts to water are not expected. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan. | *High quality or undisturbed soil, water, and air* – Alternative 3 is likely to result in the second most detrimentally affected soils and effects to site productivity from disturbance related to approximately 3,230 acres of commercial and non-commercial thinning, and construction of approximately 33 miles of new trail. Detrimental impacts to water are not expected. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan. | *High quality or undisturbed soil, water, and air* – Effects on soils under alternative 4 are expected to be negligible; no silviculture treatments are proposed, 0.4 miles of road decommissioning is expected to increase soil productivity; and trail development is expected to detrimentally impact negligible acres of soil. Detrimental impacts to water are not expected; however, fuel loads would remain high and may result in high-severity burns that would impact water quality. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | | | following the guidelines in this plan. |
| | | Sources of public drinking water – There are no public drinking water sources identified in the Magone project planning area. | | |
| | | Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land –<br>Plants – Since known and potential locations of plant species would be avoided during implementation, there would be no direct or indirect effects under alternatives 2, 3, and 4.<br>Terrestrial Wildlife – The project “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” for Pallid bat, Townsend’s big-eared bat, fringed myotis, bufflehead, bald eagle, Lewis’s woodpecker, white-headed woodpecker, and Johnson’s hairstreak; and would have “No Impact” for American peregrine falcon and silver-bordered fritillary. In the long-term, alternatives 2 and 3 would have a “Beneficial Impact” on bald eagles, Lewis’s woodpeckers, white-headed woodpeckers, and Johnson’s hairstreaks. Implementation of any alternative would not result in significant, incremental adverse effects on Management Indicator Species or their habitat within the project planning area. No adverse effects are expected to feature species. Effects to neo-tropical migratory birds are variable depending on the habitat associations of the individual species and effects to habitats; impacts to habitat for some species may occur from vegetation management of forests; however, due to the limited amount of area affected by the action alternatives, effects to neo-tropical migratory birds are expected to be minimal.<br>Aquatic Species – For all action alternatives, the project, “May Effect, Likely to Adversely Affect short-term; Beneficial Effect long-term” and “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” short-term; “Beneficial Impact” long-term” for Mid-Columbia River steelhead; “May Effect, Likely to Adversely Affect” short-term; “Beneficial Effect” long-term for Middle Columbia River steelhead designated critical habitat. For all action alternatives, the project “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” short-term; “Beneficial Impact” long-term for Interior redband trout, westslope cutthroat trout, and Columbia spotted frog.<br>Current climate projections predict a transition from a snowpack driven system to a rain driven system for streams within the project planning area. This transition would likely result in an increase in the occurrence and magnitude of “flashy” flow regimes and “scour” events during critical spawning and fry emergence times for Mid-Columbia River steelhead and Westslope cutthroat trout within East Fork Beech Creek and its tributaries. Three tributaries that originate within the Nipple Butte IRA are the primary contributers of flow to East Fork Beech Creek listed in order of contribution for perennial flow (McClellan Creek, Clear Creek, and Thompson Creek).<br>Foreseeable aquatic restoration actions proposed within the Nipple Butte IRA focus on areas | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | identified for their importance related to water storage, spawning/rearing habitat, and stream energy dissipation. Characteristics of these areas include wide depositional valleys formed by landslides or geological pinch points and debris jams. The current existing condition of these areas include incised stream channels, over-widened stream channels,lack of woody debris and channel roughness, absence of riparian hardwoods and beaver. These types of valley bottoms also have a high likelihood of occupancy by beaver when suitable cover and forage is available. Beaver can create “gaining” reaches of stream (discontinuities) within “losing” reaches of stream.<br>Perennial flow within East Fork Beech Creek and some of its tributaries are one of the major limiting factors within the watershed for Mid-Columbia River steelhead and other aquatic dependent species. Aquatic restoration actions may have adverse effects in the short-term (large and coarse wood placement, beaver habitat improvement) as described within the Malheur National Forest Aquatic Restoration Decision and Aquatic Restoration Biological Opinion II (ARBO II) but with implementation of project design criteria (PDCs) associated with these documents these affects are expected to be minimized and of short duration.<br>Increasing water storage capacity through sediment deposition and energy dissipation within incised stream channels and reconnection of floodplains is expected to result in a long-term benefit related to perennial flow within these tributaries in the Nipple Butte IRA. Establishment of suitable soils and depositional areas for riparian hardwoods within the depsitional valley bottoms is expected to result in an increase in shade and an increase in the likelihood of beaver colonization which would also increase water residence times for the tributaries.<br>The beneficial impacts are related to conifer /juniper reduction within the IRA that have altered hydrological processes related to water/sediment transport and storage and have partially contributed to degraded conditions within downslope Mid-Columbia River steelhead, redband trout, Westslope cutthroat trout, and Columbia spotted frog habitat. The primary limiting factor for aquatic species within the Magone Project planning area is water storage and release.<br>Riparian and upland systems are connected not only through the upland/riparian interface but through processes that often begin from surrounding ridglines and hillslopes. Vegetative characteristics within the Nipple Butte IRA consist of scab areas on ridgetops (see photograph on title page of this document) that have become dominated by encroaching juniper. Historically these areas consisted of a mixture of bunch grasses, bitter brush, and mountain mahogany, with scattered juniper found within rock scabs inaccessible to fire. Changes in vegetation, as a result of fire suppression and to some extent past livestock/sheep grazing has also altered sediment and water flow and transport patterns (expedited) within these upslope areas above riparian areas and thus impacted channel characteristics downslope.<br>Removal of encroaching juniper and conifers, as well as restoration of characteristic fire within these areas is expected to result in a short-term increase in sediment transport. PACFISH riparian buffers and placement of large/coarse wood, as well as beaver dam analogs, is expected to capture the majority of this sediment and recover incised channels and reconnect floodplains in downstream reaches. This will expedite recovery of these areas in the long-term and increase water storage capacity through sediment deposition and dissipation of stream energy within the channel and the floodplain. | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | Restoration of these characteristics within the three tributaries in the Niplpe Butte IRA is expected to benefit downstream reaches of East Fork Beech Creek outside the Nipple Butte IRA that in their existing condition go dry periodically. Drying results in a net loss of 1,000 offspring per steelhead red, with a 5 year average of 4.9 redds in East Fork Beech Creek. However, redd counts as high as 90 have been documented within East Fork Beech Creek. | | |
| | | Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation – The Nipple Butte IRA is primarily designated for providing semi-primitive motorized recreation in the project planning area. Effects to semi-primitive classes of recreation, including isolation from the sights and sounds of man, would be affected by the increase of human presence and activity during the time of proposed treatments (i.e., mechanical treatments, prescribed burning) under alternatives 2 and 3.<br>The opportunity to enjoy semi-primitive, non-motorized recreational experiences would increase in the long-term. Under alternative 2, trail developments would greatly increase the hiking and bicycling opportunities; there would be a moderate distance of new trail (19.4 miles) built. Under alternative 3, trail developments would significantly increase the hiking and bicycling opportunities with 32.7 miles of new trail. | | Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation – Effects under alternative 4 from silviculture and prescribed burning treatments would be greatly reduced since no silvicultural treatments are proposed under this alternative and prescribed burning would be implemented on only 1,405 acres within the IRA.<br>Trail developments would somewhat improve the hiking and bicycling opportunities with a very small distance of new trail (7.6 miles). |
| | | *Natural appearing landscapes with high scenic quality; Reference landscapes* – There would be some visual effects to the landscape. Stumps would be visible in all treated units within the IRA. Various lengths of new recreation trails would be constructed. However, the objectives and guidelines associated with the visual quality objectives for each management strategy intersecting a treatment area would be met. Short-term acceptable effects from treatments are recognized and long-term enhancement to the visual landscape is expected.<br>For the effects to Reference Landscapes refer to the effects of silviculture treatments and effects of prescribed burning below. | | *Natural appearing landscapes with high scenic quality; Reference landscapes* – There would be no mechanical impacts within the IRA. There would be limited direct visual effects to the landscape from trail construction. The objectives and guidelines associated with the visual quality objectives for each management strategy would be met.<br>For the effects to Reference |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | | | Landscapes refer to the effects of silviculture treatments and effects of prescribed burning below. |
| | | *Traditional cultural properties and sacred sites* – All traditional cultural properties and sacred sites would be avoided under alternatives 2, 3, and 4. Therefore, there would be no direct or indirect effects to traditional cultural properties and/or sacred sites. | | |
| | | *Other locally identified unique characteristics* – There are no other locally identified unique characteristics in the Magone project planning area. | | |
| Effects of silviculture treatments | Without entering the Nipple Butte IRA, many acres of overstocked forest would be left unmanaged. Previous fire suppression and other activities have led to encroachment of species that would have been regularly thinned naturally with fire suppression. Both in and out of the IRA, this has led to stocking levels and species compositions different to what would have occurred historically.<br>Sixty percent of the old forest structure (OFSS and OFMS) within the project planning area is within the Nipple Butte IRA. In the Hot Dry and Warm Dry PAGs, which cover 66 percent of the project planning area, if no actions are taken, those PAGs would double their current range, increasing overstocking in old forest types, which might lead to these areas having a greater chance of uncharacteristic wildfire or insect infestation. Younger structural stages would decrease over time in the Warm Dry and Hot Dry PAGs, decreasing to below HRV.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with OFSS moving in and out of HRV, OFMS exceeding HRV and increasing over time, and the | The majority of the Nipple Butte IRA is composed of WarmDry and Hot Dry PAGS, within which the old forest structure (OFSS & OFMS) would increase overtime to be within (OFSS) or above (OFMS) HRV. Young forest in the Warm Dry PAG would be below or on the low side of HRV, and in the Hot Dry PAG SI would be well above the historic range.<br>The pocket of Cool Moist would follow the trend of Old Forest structure increasing and remaining well above HRV, and young forest would be decreasing to below HRV. | The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 3 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055, similar to what would be seen under alternative 2.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends of old forest structure increasing and remaining well above HRV, with more OFSS and less OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2. | The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055, similar to what would be seen under alternative 2. Young forest structure in the Hot Dry PAG would also be below or on the lower end of HRV in 2055, in contrast to the increase in SI to well above HRV that would be seen under alternative 2.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends of old forest structure |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | younger strata decreasing over time (with YFMS and UR moving below HRV). | | | increasing and remaining well above HRV, with significantly less OFSS and OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2. |
| Effects of prescribed burning | Fuel loadings are uncharacteristically high as a result of suppression efforts and insect and disease- caused conifer mortality. Fuel loading in 2055 would make fire suppression more difficult, which directly affects the ability to protect life, resources, and property. Moderate to heavy fuel loading is expected to comprise the majority of the IRA. Lower fuel loading is predicted in the center of the IRA; however, the east and west boundaries are predicted to have moderate to heavy fuel loadings in 2055.<br>By 2055 the north half of the IRA, particularly the northeast corner, would be affected by crown fire should an ignition occur under the right conditions.<br>Roadless area ecosystem characteristics within the IRA would continue to depart from historical composition and structures, leading to uncharacteristic effects if a wildfire were to occur during high or extreme fire danger. | Under alternative 2, stands within the IRA with light fuel loads remain about the same after treatment. The biggest effect would be a decrease in the number of stands with heavy fuel loads. It is anticipated the majority of acres with heavy fuel loads would shift to moderate fuel loads following treatment.<br>The potential for sustained crown fire within the IRA would be minimized.<br>Treatments proposed under alternative 2 align with the roadless rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1). | The beneficial effects within the Nipple Butte IRA are similar to the effects described under alternative 2. Alternative 3 proposes additional mechanical treatments within the IRA, and combined with the proposed prescribed fuels treatments a slightly greater reduction in fuel loading and potential crown fire can be seen compared to alternative 2.<br>Treatments proposed under alternative 3 align with the Roadless Rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1). | Alternative 4 proposes no mechanical treatments in the Nipple Butte IRA. With the exception of the northeast corner of the IRA, no planned ignitions are prescribed either. Direct and indirect effects would be similar to those described in the no action alternative in untreated stands within the IRA. If timing and weather allowed, management of unplanned ignitions would potentially reduce fuel loading and crown fire potential in the IRA. With the absence of mechanical treatments and relying solely on unplanned ignitions to manage fuels in the IRA, fuel and vegetation conditions would likely continue their departure from historical conditions and eventually succumb to the effects of wildfire or insect and disease. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Effects of hiking/bicycle trails | The no action alternative would perpetuate existing conditions. Seasonal usage patterns and levels would remain the same.<br>Attractive mountain biking opportunities would continue to be nonexistent. | Trail developments would significantly increase the hiking and bicycling opportunities. There would be a moderate distance of new trail (19.4 miles) built within the Nipple Butte IRA. | Trail developments would be extensive and would very significantly increase the hiking and bicycling opportunities. This alternative would have the greatest distance of new trail mileage (32.7 miles) within the Nipple Butte IRA. | Trail developments would somewhat improve the hiking and bicycling opportunities. There would be only a very small distance of new trail (7.6 miles) within the Nipple Butte Inventoried Roadless Area (IRA). |
| Impacts to forage/wildlife | Upland shrub enhancement (conifer removal) treatments would not occur under this alternative and mahogany/bitterbrush communities would continue to be encroached and could ultimately be lost in the long-term. These communities provide critical quality browse and hiding cover for big game species. Allowing these upland shrub areas to continue to be overtopped and diminished could result in a substantial loss of quality habitat for elk and mule deer. | Following the completion of implementation of vegetation treatments (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Forage would increase under all alternatives.<br>Upland shrub enhancement would be expected to improve big game habitat vastly on 3,865 acres in the IRA, the majority of which would occur in the Wildlife Emphasiss Area (WEA). | Following the completion of implementation of vegetation treatments (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Forage would increase under all alternatives.<br>Upland shrub enhancement would be expected to improve big game habitat vastly on 3,865 acres in the IRA, the majority of which would occur in the WEA. | The vegetation treatments proposed in alternative 4 would have similar beneficial effects to elk habitat, however not as evident compared to alternatives 2 and 3. The lack of upland shrub enhancement (conifer removal) treatments in the Nipple Butte WEA is noticeable under alternative 4 as habitat effectiveness index values actually decrease. |

# Decision Framework

The Forest Supervisor of the Malheur National Forest is the responsible official who will review the proposed action, the alternatives to the proposed action, and the environmental consequences to make a decision. The decision should contain activities that best meet the purpose and need, desired future condition, and provide consistency with Malheur Forest Plan standards and guidelines for all related resource areas. The decision would include design criteria necessary for the activities to take place and provide resource protection. The Forest Supervisor will decide whether to:

- Select one of the action alternatives that has been considered in detail, or
- Modify the selected alternative, and
- Identify what mitigation measures would apply, or
- Select the no action alternative.

If only a portion of activities from one of the action alternatives is selected, or a combination of activities from multiple action alternatives is selected, then the Forest Supervisor will decide whether to amend the Malheur Forest Plan.

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# Chapter 1. Purpose and Need for Action

## 1.1 Introduction

The Magone project planning area is one of the planning areas identified for accelerated restoration on the Malheur National Forest. An interdisciplinary team gathered information at a watershed scale and used that information to develop a suite of activities to improve resource resiliency, processes, and functions within the Magone project planning area.[1] The team identified a variety of activities that would move the planning area towards its desired future condition.

The Forest Service has prepared this draft environmental impact statement (DEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This DEIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into the following chapters:

- **Chapter 1. Purpose and Need for Action**: This chapter includes information on the background, and purpose of and need for the project. This section also details how the Forest Service informed the public of the proposal and the issues identified through public scoping.
- **Chapter 2: Alternatives, including the Proposed Action**: This chapter provides a more detailed description of the proposed action as well as alternative methods for meeting the need for action. These alternatives were developed based on issues raised by the public and other agencies. This section also provides a summary table of the design components that compares the relative risks and benefits of each alternative.
- **Chapter 3: Affected Environment and Environmental Consequences**: This chapter describes the current condition of the resources in the Magone project planning area. It also details the environmental effects of implementing the proposed action and other alternatives.
- **Chapter 4: Preparers and Contributors**: This chapter provides a list of preparers and agencies and people consulted during the development of the environmental impact statement. Chapter 4 also includes a glossary of definitions for technical terms used in this document, a list of references cited in this document, and an index.
- **Appendices**: The appendices provide more information to support the analyses presented in the environmental impact statement.

Additional documentation, including site-specific reports with more detailed analyses of project area resources, may be found in the project planning record located at the Malheur National Forest, Blue Mountain Ranger District, John Day, Oregon.

[1] The term **project planning area** (or **planning area**) is used to describe the overall area of consideration that was reviewed for the development of treatment needs and opportunities. **Project areas** are defined as the areas within the broader project planning area where activities are being proposed and would occur; project areas are identified in Chapter 2.

## 1.2 Background

The proposed action and other action alternatives were developed through a collaborative process involving the public, the Blue Mountain Forest Partners (BMFP) collaborative, and Malheur National Forest staff. Beginning in the summer of 2014, fieldtrips and meetings were held with collaborators to discuss the existing and desired conditions of the project planning area, and a potential suite of activities to achieve those desired conditions.

On June 18, 2014, BMFP and Malheur National Forest staff visited sites within the Nipple Butte Inventoried Roadless Area (IRA) in the Magone project planning area. Site visits within the IRA included discussions on fir and juniper encroachment, wildlife habitat improvement, forest densities, ladder fuels, fire starts, potential silviculture treatments, and natural ignition.

On July 16, 2014, Blue Mountain Forest Partners and Malheur National Forest staff visited sites around the Magone Lake recreation area. Discussion topics at the sites visited included aesthetics and visuals, fir encroachment, safety corridors, trail improvements, fuel breaks, ladder fuels, cool moist pockets, and recreation site management versus lake management.

In September 2014, the Forest Service interdisciplinary team for the Magone Project presented resource stories on the existing condition of the project planning area to the Blue Mountain Forest Partners collaborative at their regular monthly meeting. The resource stories served as a baseline for developing proposed treatments. These same resource stories were also presented at a public open house meeting on September 24, 2014. Stakeholders of the project planning area were invited to attend and an article was published in the Blue Mountain Eagle on August 27, 2014, to announce the meeting to local interested public. In addition, flyers were circulated at the Magone Campground in the summer and fall and there was a radio spot on the radio station KJDY where the District Ranger shared information about the planning process for the Magone Project. The extended and more detailed versions of the Magone Project resource stories can be found online:
https://www.youtube.com/playlist?list=PL6ZBnsdnJddrU7TNXorZsK844YMjK6JgL.

On April 15, 2015, BMFP and Malheur National Forest staff visited sites within the Nipple Butte IRA. Site visits within the IRA included discussions on prescribed burning and removing conifers and juniper that are encroaching upon and shading out mountain mahogany and other upland shrubs. Other fieldtrip stops looked at a stand that is proposed to be moved from dedicated old growth to replacement old growth designation, with thinning to help create variable density and move the stand toward old growth characteristics.

## 1.3 Project Planning Area

The Magone Project is located on the Blue Mountain Ranger District within the Malheur National Forest. The project planning area is located in Grant County approximately 7 miles north of the town of John Day, Oregon. The Magone project planning area encompasses approximately 27,000 acres in the Grub Creek and East Fork Beech Creek subwatersheds that drain into the Upper John Day River. The main road access to the project planning area is via County Road 18 off US Highway 26 from east of the project planning area and County Road 18 off US Highway 395 from the west. See Appendix B – Project Maps, Map 1.

The legal description for the project planning area is (township, range, and sections):

- Township 11 South, Range 31 East, sections 25-29, 32-36;
- T. 11 S., R. 32 E., sec. 30-32;
- T. 12 S., R. 31 E., sec. 1-5, 8-12, 13-15, 17-24;
- T. 12 S., R. 32 E., sec., 5-11, 15-20, Willamette Meridian.

Magone Lake, the most popular developed recreation resource on the Blue Mountain Ranger District, is located within the project planning area. Magone Lake was formed by a landslide in about 1840. In addition to the lake, the project planning area includes 19 dispersed campsites, 15 miles of foot/horse/bicycle/off-highway vehicle (OHV) trails, 1 designated snowmobile trail, and 1 developed OHV trail.

The Magone project planning area ranges in elevation from 3,520 feet at the western boundary of the project planning area to 6,240 feet at the northern boundary.

There are eight plant association groups (PAGs) that occur within the Magone project planning area as displayed in Table 1. The four largest PAGs in the project planning area are Warm Dry Upland Forest (UF), Hot Dry UF, Warm Moist UF, and Cool Moist UF.

**Table 1. Plant association groups in the Magone project planning area**

| Plant association group (PAG) | Acres* |
|---|---|
| Warm Dry Upland Forest (UF) | 14,170 |
| Hot Dry UF | 4,470 |
| Warm Moist UF | 2,230 |
| Cool Moist UF | 2,070 |
| Hot Moist Upland Woodland (UW) | 1,790 |
| Cold Dry UF | 990 |
| Cool Dry UF | 90 |
| Warm Moist Upland Herbland (UH) | 20 |

*Some areas do not have a PAG identified, so the total acreage is less than the project planning area.

Approximately 10,195 acres of the 11,525-acre Nipple Butte Inventoried Roadless Area (IRA) is located within the Magone project planning area (comprising 38 percent of the total project planning area). The area is comprised primarily of steep, mountainous terrain and is dissected by the Clear Creek and McClellan Creek drainages. The principle recreation use of the area is big-game hunting. The natural appearance of the area has been impacted by grazing, recreation, and fire suppression (USDA Forest Service 1990b, pages C-112 to C-117). In addition, there are several roads and past timber harvest units within the IRA.

## 1.4 Purpose and Need

The purpose and need for the Magone Project was developed by comparing the management objectives and desired conditions in the Malheur Forest Plan to the existing conditions in the project planning area related to forest resiliency and function. Where plan information was not explicit, best available science and local research were utilized in a collaborative setting with stakeholders.

The overall purpose of this project is to restore forest resiliency by reestablishing and restoring forest structure and pattern, vegetation composition and diversity, and riparian communities to conditions that are more resilient to natural disturbance processes, including wildfire. Comparison of the existing and desired future condition indicates the specific needs to:

- Restore forest structure, composition, and density toward more resistant and resilient vegetative conditions given the historical fire regime.
- Reduce the fuel loadings, including the density and horizontal and vertical connectivity of standing vegetation, surface fuels, and/or ladder fuels to restore characteristics of ecosystem composition and structure to reduce uncharacteristic wildfire effects within the project planning area including the Nipple Butte IRA and wildland urban interface (WUI). Reduce fuels along County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan.
- Maintain or improve habitat for fish and wildlife species present in the project planning area.
- Improve one or more of the nine roadless area characteristics (as defined by the 2001 Roadless Area Conservation Rule) within the Nipple Butte IRA.
- Provide for a variety of social values and opportunities in the watershed, including availability of traditional use plants (including huckleberries), a variety of wood products (including merchantable sawtimber and post and poles), grazing, enhanced recreation experiences around Magone Lake, and forest management employment opportunities to help maintain and improve community stability and infrastructure, recreational opportunities, and a safe road system that moves toward current public access and resource management objectives.

## 1.4.1 Existing and Desired Future Condition

### 1.4.1.1 Forest Structure, Composition, and Density

The Malheur National Forest Land and Resource Management Plan, as amended by the Eastside Screens, provides the basis for actively addressing restoration toward the historical range of variability and moving the area toward a more resistant and resilient landscape. Currently, values and features associated with and adjacent to the project planning area such as the Magone Lake recreation area, dispersed recreation sites and trails, the Nipple Butte IRA, old growth management areas, wildlife habitat, riparian corridors, and scenic views are susceptible to a wide-scale disturbance. The purpose of silvicultural treatments is to shift the forest structure, composition, and density toward historical conditions and to reduce susceptibility to insects and disease. There is a need to break up fuel continuity and strategically place treatments to account for these values and features. The need for increasing resistance and resilience applies to all plant association groups in the project planning area.

In 2014, the Magone project planning area was evaluated by the Blue Mountains Forest Insect and Disease Service Center. The results of this field evaluation are:

- Most of the forested areas in the Magone project planning area are significantly overstocked.
- Mixed conifer stands no longer resemble their historical assemblages and are currently at a risk of high severity fire, defoliator outbreaks, and bark beetle attacks.

- Mixed conifer stands that are now dominated by grand fir and Douglas-fir show evidence of a large departure from their historical stand composition, structure, and density.
- The current low density of large, old ponderosa pine and larche, and a much higher density of younger, smaller fir is evidence of historically fire-maintained, open, early-seral dominated stands.
- The evidence of prior dominance by seral ponderosa pine and western larch indicates historically frequent fires, where pine and larch could establish on mineral soil seedbeds (Spiegel et al. 2014).

Plant associations for the Blue Mountains were grouped into plant association groups (PAGs) by Powell et al. (2007) based on a temperature/moisture gradient and represent similar ecological environments. Plant association groups are used in this analysis to differentiate between different forest types. Approximately 86 percent of the Magone project planning area is composed of upland forest, with the majority of the area in the Warm Dry and Hot Dry PAGs (66 percent). The Cool Moist (8 percent), Warm Moist (8 percent), and Cold Dry (4 percent) PAGs are also present, and there are small amounts of other PAGs, riparian forest, and juniper forest types scattered across the area. See Appendix B – Maps, Map 18.

The desired future condition is to increase the resiliency of the Magone project planning area:

- Reduce stand density to manage more within the management zone.[2]
- Shift towards more historical species composition given the historical fire regime.
- Shift towards structural stages that are within or moving towards the historical range of variability.

Obtaining these conditions would increase tree growth and vigor, decrease risk of large-scale, stand-replacement wildfire, and reduce the susceptibility of epidemic insect and disease outbreaks.

### *Disturbance Processes*

The Magone project planning area has historically and is currently being affected by many disturbance agents including insects, diseases, fire, and human related disturbances such as timber harvest, fire suppression, and grazing. Fire and fire management has played a major role in shaping the structure, species composition, and density of this area, and will continue to play this role into the future.

There are many insects present within the Magone project planning area that include bark beetles and defoliators. Currently, all of the insects present are at low levels where they play an important role in contributing to structural diversity and providing dead wood habitat for wildlife and soil productivity. Scattered individual tree mortality creates small openings in stands where pockets of understory can establish.

[2] 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. The management zone is where silviculturists tend to prescribe to manage within, because site resources are generally being captured into tree growth and there is high stand growth. See the Forest Vegetation section of chapter 3 and the Silviculture Report for more information about the management zone.

There are many diseases prevalent within the Magone project planning area including dwarf mistletoes, armillaria, annosus, and Indian paint fungus. As with insects, these diseases play a role in creating structural diversity, creating a source of snags and down logs, providing important wildlife habitat, and recycling nutrients to maintain soil productivity. At severe levels, these diseases can greatly inhibit tree growth and old forest structure. They also provide unique wildlife habitat, such as roosting sites for grouse.

The desired condition is for insects and disease to continue to play a role at endemic levels. Meeting the desired condition for structural stages, species composition, and density would maintain insects and diseases on the landscape at endemic levels, creating individual tree mortality and small patches of snags and dead and down wood, which provide valuable wildlife habitat. This would also reduce the risk of insects and diseases reaching epidemic levels, which would cause widespread mortality, and consequently increasing fuel loading and fire hazard.

#### *Aspen Stands*

Aspen has been documented at approximately 10 locations within the project planning area. The aspen overstory of most stands is single-storied and even-aged with many stands likely close to the end of their natural life cycle. Many of the stands are still suckering, but at a reduced rate and most suckers do not reach sapling size because of ungulate browsing.

The desired condition is a landscape containing healthy stands that are characteristic of historical conditions in representation and distribution. Aspen stands would be well represented by different age classes of stems, from suckers to large old trees. Healthy clones would have existing young stems, and periodic suckering to replace old stems that die. Healthy clones would also maintain or fully occupy their community type. Swanson et al. (2010) state that removal of competing conifers by natural disturbance or management action is required to perpetuate aspen in many cases. Herbivory also prevents aspen regeneration in many areas, and thus fencing is usually needed (Swanson et al. 2010).

### 1.4.1.2 Fuel Loading

The Magone project planning area has predominantly a general south to southwest aspect; however, all aspects are represented. Slope steepness greater than 60 percent can be found throughout the project planning area, but generally, slopes are less than 40 percent. During fire season, days with high fire danger often see temperatures rise above 80 degrees Fahrenheit, relative humidity fall into the mid-teens, and winds exceeding 10 miles per hour generally out of the west to south. These weather conditions combined with the all too common dry or mostly dry lightning storms that occur in the summer months can present difficult challenges during suppression activities in the Magone project planning area. In addition to the Magone Lake recreation area, there are structures located within or adjacent to the project planning area, and approximately 25 miles of shared boundary between national forest lands and private lands.

The Magone project planning area has a high fire risk based on the potential and frequency for wildfire ignitions in the area (mostly caused by lightning). There has been an increase in understory vegetation and surface fuels, a change in species composition, and an increase in the continuity of vertical and horizontal stand structure. The majority of the Magone project planning area has light fuel loads of less than 8 tons per acre (tonnage calculations only include down woody material).

However, many of the forested stands identified as having moderate (8-15 tons per acre) to heavy (15+ tons per acre) fuel loads are located adjacent to or within the Magone Lake recreation area and alongside designated safety corridors and the wildland-urban interface. Greater fireline intensities, increased mortality, and resistance to control efforts can all be expected in areas with higher fuel loads.

There is potential for passive crown fire (when single trees or small groups of trees torch) on approximately 35 percent, crown conditional (when crown bulk density is high enough to sustain a crown fire even though there is not enough surface and ladder fuels to lift the fire into tree crowns) on approximately 7 percent, and active crown fire (when the fire moves through the crowns of adjacent tightly spaced trees) on approximately 12 percent of the project planning area; the potential for surface fire is present on 46 percent of the project planning area. Much of the larger ponderosa pine and western larch in the project planning area have smaller grand fir and Douglas-fir growing as ladder fuels underneath. The Forest Vegetation Simulator (FVS) model indicates some classification of crown fire is likely within and adjacent to the Magone Lake recreation site should a fire occur on days with hot, dry, and windy weather forecasted. Additionally, FVS indicates Forest Service roads (FSR) 18 and 36 and the western boundary of the project planning area could likely experience extreme fire behavior under the conditions mentioned previously.

Historical stand structure played an important role in maintaining fire-dependent forest types (Graham et al. 2004). Most of the forest in the project planning area is overstocked and mixed conifer stands no longer resemble their historical assemblages (i.e., there is now a higher proportion of grand fir and Douglas-fir rather than ponderosa pine and western larch) (Spiegel et al. 2014).

Part of the desired future condition is to reduce fuels along County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan. In the event of a wildfire the roads could serve as the evacuation route for the residents of homes or ranches outside of the project planning area, recreationists on the Malheur National Forest, or those utilizing adjacent lands. This is particularly important in this project planning area due to the high level of use at the Magone Lake Recreation Area.

The Malheur Forest Plan (USDA Forest Service 1990a), Malheur National Forest Fire Management Plan (USDA Forest Service 2013), and National Fire Plan (USDA Forest Service and USDI Bureau of Land Management 2001, 2002, and 2006) provide guiding direction for fuels management in the Magone project planning area. Overall, the desired condition is to have fire maintain a mosaic of diverse native plant communities; there would be a mosaic of stand structures reflective of the vegetation structures and fuel loadings historically found when fires played a more frequent and natural role in the area. Available fuel is the only factor that can be changed through management actions. The desired fuels condition include a mixture of stands with moderate densities of understory conifers and ladder fuels intermixed with other stands exhibiting low densities of small conifers and other ladder fuels, lower canopy densities (less dead standing trees and live individual tree crown overlap), and increased distances from surface fuels to tree crowns. Surface fuels (small trees, shrubs, and dead and down vegetation) and overall canopy density would be a mosaic of open and closed crowns. Reducing surface fuels is directly correlated to fireline intensity. The desire would be to manage fuels such that fire starts in the area would generally exhibit ground fire behavior with occasional torching leading to reduced potential for a surface fire to transition into an active crown fire.

The desired condition is to have fire function as a natural disturbance within the ecosystem without causing loss to ecosystem function or to human safety, lives, and values. Over time, conditions would allow managers to use fire to maintain the area as a functioning ecosystem. Fire would continue to play an important role in shaping and maintaining the vegetative communities and wildlife habitat across the landscape. Maintaining these low and mixed-severity fire regimes over time would minimize the loss of old growth and wildlife habitat for the vast majority of species that evolved within the historical fire regimes. Fuel loadings would provide for adequate duff and coarse woody debris to minimize soil exposure and maintenance of long-term site productivity.

#### 1.4.1.3 Habitat for Fish and Wildlife Species

*Aquatic Habitat*

The Beech Creek and Upper John Day Watershed meets the criteria for a PACFISH key watershed. Criteria considered to designate key watersheds are:

1. Watersheds with stocks listed pursuant to the Endangered Species Act, or stocks identified in the 1991 American Fisheries Society report as “at risk” or subsequent scientific stock status reviews; or
2. Watersheds that contain excellent habitat for mixed salmonid assemblages; or,
3. Degraded watersheds with a high restoration potential.

The intent of designating key watersheds is to protect and restore habitat for anadromous fish across the landscape (USDA Forest Service and USDI Bureau of Land Management 1995).

Fish habitat in the analysis area generally does not meet Malheur Forest Plan desired future conditions (DFCs) and riparian management objectives (RMOs) for pool frequency, large woody debris (LWD), sediment, temperature, and width-to-depth ratio. The condition of important habitat elements including low pool frequency, high water temperatures, reduced LWD frequency, high fine sediment levels, and moderately high width-to-depth ratios indicate reduced fish habitat quality as a result of past management activities. Although bank stability does meet the RMOs in general, specific locations where bank instability is occurring are not in the appropriate locations. Areas of bank instability often occur on the outside banks of stream meanders. Many of the streams, in particular East Fork Beech Creek, have eroded down to the stream armor layer with limited or no stream banks present. Where stream channels have been straightened, bank instability is occurring on both sides of the stream channel (mostly related to roads and removal of LWD) due to excessive stream energy and lack of energy dissipation in the form of LWD, sinuosity, and floodplain roughness. Most streams in the analysis area are in a highly altered state, with conditions of important habitat elements strongly limiting quality of fish habitat and water storage capabilities.

Mid-Columbia River steelhead (threatened species under the Endangered Species Act and Malheur Forest Plan Management Indicator Species [MIS]), redband trout (Region 6 sensitive species and MIS), and westslope cutthroat trout (Region 6 sensitive species) are documented to occur within the project planning area. There is Mid-Columbia River steelhead critical habitat within the project planning area. In addition, the Columbia spotted frog (Region 6 sensitive species) is considered present in all subwatersheds of the Malheur National Forest and is known to occur within the analysis area.

The desired future condition for the Magone project planning area is to have a properly functioning watershed, including restored natural processes and functions that allow the watershed to maintain diversity and complexity. Objectives would be met from multiple sources including: 1973 Endangered Species Act, 1976 National Forest Management Act, 1990 Malheur Forest Plan, 1995 Interim Strategy for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH).

*Wildlife Corridors*

The Eastside Screens (USDA Forest Service 1995a) gives direction for maintaining connectivity between late and old structure habitats to allow the free movement of old growth wildlife species. Late and old structure stands need to be connected with each other inside the watershed and to like stands in adjacent watersheds in a contiguous network pattern by at least two different directions. Under Amendment #2, corridors should commonly have medium diameter or larger trees and canopy closure within the upper third of site potential. Corridors should be at least 400 feet wide. If stands with these conditions are not available, then the next best stands would be selected and should be managed to improve connectivity.

The desired condition is that stands of different sizes and ages would be dispersed across the landscape to provide a mixture of forage and sustainable security cover for big game. Large diameter (greater than 20 inches) down woody debris and snags would exist in densities to support reproductive populations of dependent species. Down woody material would exist at levels providing for the needs of wildlife species dependent on this habitat component. Old Forest would be within the historical range of variability and well connected via wildlife corridors to facilitate movement of wildlife species between distant Old Forest patches. Unique and sensitive habitats would occur in context with surrounding vegetation that allows for their use by associated wildlife species. Wildlife nests and den sites would contain the structural and security characteristics necessary for successful reproduction and rearing of young to dispersal age.

*Roads*

Several roads adjacent to streams in the project planning area are causing resource damage. One of the objectives of the Malheur Forest Plan for roads is to “[m]anage the transportation network to reduce the cost and impact of roads…to correct chronic sediment sources and prevent fish barriers…” (USDA Forest Service 1990a, page IV-23).

The desired future condition is to close or decommission roads out of sensitive riparian areas to reduce sediment inputs into the affected streams, and restore floodplain and habitat connectivity.

#### 1.4.1.4 Roadless Area Characteristics in the Nipple Butte Inventoried Roadless Area

The Nipple Butte IRA makes up approximately 37 percent of the Magone project planning area (approximately 10,000 acres of the 27,000-acre project planning area). IRAs were identified in the 2001 Roadless Area Conservation Rule in a set of inventoried roadless area maps, contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November 2000, which are held at the National headquarters office of the Forest Service, or any subsequent update or revision of those maps (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for the protection of IRAs.

Most IRA boundaries are substantially identical to those identified as “roadless areas” referred to in the 1982 planning rule (36 CFR 219.17) and identified by the Malheur Forest Plan, FEIS, Appendix C.

The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs with some Cool Moist, Warm Moist, and Cold Dry forest. There is also a component of non-forested areas. Approximately 45 percent of the Nipple Butte IRA is composed of late and old structure (old forest single stratum[3] and old forest multi strata[4]). In the Warm Dry and Hot Dry PAGs old forest single stratum and stand initiation[5] are both below the historical range of variability. There are also a few small aspen stands (approximately 0.5 acres in total) within the Nipple Butte IRA, mostly within riparian habitat. These stands are being encroached upon by young ponderosa pine, and are currently much reduced from their historical extent.

The northern portion of the Nipple Butte IRA has several areas with heavy fuel loadings. Fuel loadings are uncharacteristically high as a result of suppression efforts and insect and disease-caused conifer mortality (USDA Forest Service 2010a). Crown fire potential exists along the roadless boundary, with the exception of the southeast corner. Fire suppression has altered the natural succession of the area. Under natural conditions, low-intensity fire would have selectively maintained ponderosa pine in the understory and prevented the encroachment of fir (USDA Forest Service 2010a). Fire-intolerant species, such as grand fir, growing in the understory exhibit dense crowns and grow in tighter spacing, creating a situation where crown fire can be initiated. With difficult topography, limited access, and fuel loads increasing, successful suppression efforts would become more difficult to achieve. With this existing condition, the Nipple Butte IRA would likely succumb to wildfire or disease and insects in the foreseeable future.

Several timber sales have occurred in the IRA:

- In 1986, 77 acres were harvested in the SADD SSTS project. Low vigor overstory trees and trees with heavy mistletoe infection were removed by tractor logging.
- In 1989, 14 acres were harvested in Keen Salvage using crawler tractors and skidders. Salvage included dead and dying trees experiencing mortality from western spruce budworm and bark beetle attacks.
- In 1990-1991, 8 acres experiencing pine beetle mortality was treated in the Lake Lodgepole project. Live and dead lodgepole ≥4 inches were removed by tractor logging.

Several roads are currently present in the Nipple Butte IRA; approximately 1.5 miles of open Forest Service road (maintenance level 2) and approximately 0.14 miles of County Road 32.

Approximately 200 acres of the Nipple Butte IRA were formerly owned by the Oregon Lumber Company (located in the “thumb” in the northeast part of the IRA and another piece in the northwest portion of the IRA); these lands were acquired by the Malheur National Forest in a land exchange in the 1940s.

[3] Old forest single stratum – Broken or continuous canopy of medium and large, old trees. Large trees are frequent and the understory is limited to few seedlings and saplings.
[4] Old forest multi strata – Large trees are frequent, has multiple canopy strata and multiple age classes.
[5] Stand initiation – A single canopy stratum of seedlings and saplings established after a stand-replacing disturbance.

The majority of Clear, McClellan, and Thompson creeks that contain MCR Steelhead Critical Habitat and Westslope cutthroat trout are within the Nipple Butte IRA. In general, these streams are wide and shallow "dished out", lack quality pools (greater than 2 feet deep), are dominated by large cobble, have too much fine sediment, and don't provide quality habitat complexity. Mean maximum water temperatures are above the suitable range for salmonid species present. The lowermost 3 miles of Clear Creek and McClellan Creek prior to their confluence with East Fork Beech creek have stream gradients of less than three percent, wide valley bottoms, along with suitable spawning gravels that are currently being flushed out of the system. These areas contain the primary MCR Steelhead spawning areas within the Nipple Butte IRA. However due to their degraded condition only a fraction of their spawning habitat potential is being realized.

Large woody debris (LWD) objectives (from PACFISH and the Malheur Forest Plan) are not being met within the lower most three miles of the IRA and this is impacting spawning gravel retention, stream sinuosity, floodplain connectivity, and water retention within these areas. However, the streams that are the closest to meeting LWD objectives are within the upper reaches of the IRA and are not proposed for aquatic restoration activities. Many of these streams have stands of large trees with closed canopies stretching along the stream, and are therefore meeting shade objectives.

The 5,795 acre Nipple Butte Wildlife Emphasis Area (WEA; Management Area 21) is located entirely within the Nipple Butte IRA. Although Habitat Effectiveness Index and cover requirements are meeting or exceeding Malheur Forest Plan standards, cover requirements are not always compatible with the historical range of variability. This conflict is apparent in Hot Dry and Warm Dry forests dominated by ponderosa pine. Historical conditions and fire return intervals created large blocks of trees with canopy closure too low to be classified as satisfactory or marginal cover as defined in the Malheur Forest Plan. Today, cover requirements are being met on many ponderosa pine sites; however, stands are at a density level where mortality risk is high from both bark beetle and wildfires. Cover levels may not be sustainable. This inherent conflict may be even more relevant in winter range, which is often located in low elevation, Hot Dry and Warm Dry forests dominated by ponderosa pine. Unfortunately, tree thinning, the treatment that most effectively reduces beetle and fire risk, also reduces the effectiveness of a stand as cover.

Currently, the amount of forage and browse is below what it would have been historically, particularly in drier habitat types and along ridgetops. Lack of fire in adjacent habitat types has allowed juniper and other conifers to encroach into areas formerly dominated by mountain mahogany, bitterbrush, and other forage and browse species. In the Nipple Butte IRA, and throughout the project planning area, these species are being shaded out and lost. These habitats provide critical cover and forage for Rocky Mountain elk (Malheur Forest Plan Management Indicator Species) and mule deer, and provide habitat for a plethora of small mammals and birds including blue grouse (featured species) and red-naped sapsuckers (Malheur Forest Plan Management Indicator Species).

Portions of the Mt. Vernon/John Day, Roundtop, and Beech Creek range allotments are located in the Nipple Butte IRA. Grazing effects include cross-fencing, water developments, salt and dusting grounds, vegetative trampling, and the physical presence of cattle.

The primary recreational use in the Nipple Butte IRA is hunting. Recreational use impacts include a few fire rings and undeveloped hunter camps with soil compaction and primitive game racks.

There is also a portion of the general purpose Nipple Butte Trail, which traverses the ridgeline on the north border of the Magone project planning area.

The desired future condition is to enhance two of the nine roadless characteristics (features that are often present in and characterize inventoried roadless areas) as identified in the 2001 Roadless Area Conservation Rule (36 CFR 294.11). Specifically:

- **Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land –**
    - Mid-Columbia River steelhead (threatened species), Mid-Columbia River steelhead Critical Habitat, and Westslope cutthroat trout (Region 6 Sensitive species) are present in the Nipple Butte IRA. The desired future condition is to improve habitat for these species from its currently degraded state, specifically lowering water temperatures, reducing fine sediment levels, increasing large woody debris levels, and increasing floodplain connectivity.
    - Rocky Mountain elk (Malheur Forest Plan Management Indicator species) and mule deer are species that are dependent on an adequate mix of cover, forage, and undisturbed security areas; the Magone project planning area includes approximately 12,084 acres of winter range (including the Nipple Butte Wildlife Emphasis Area) and 15,002 acres of summer range for Rocky Mountain elk. The desired future condition for this area is to provide the greater amount of forage and browse that would have been present historically, particularly in drier habitat types and along ridgetops (areas were formerly dominated by mountain mahogany, bitterbrush, and other forage and browse species).
- **Reference landscapes –**
    - Currently, many of the structural stages of the primary plant association groups (PAGs) present in the Nipple Butte IRA are outside the historical range of variability (HRV). The desired future condition is to move these PAGs within or towards HRV. Specifically, increasing the amount of old forest single stratum and stand initiation in the Warm Dry PAG, and increasing the amount of old forest single stratum, understory reinitiation, and stand initiation in the Hot Dry PAG.
    - Fire suppression has altered the natural succession of the Nipple Butte IRA. Under natural conditions, low-intensity fire would have selectively maintained ponderosa pine in the understory and prevented the encroachment of fir (USDA Forest Service 2010a). Fire-intolerant species, such as grand fir, growing in the understory exhibit dense crowns and grow in tighter spacing, creating a situation where crown fire can be initiated. The desired future condition is to reduce the uncharacteristically high fuel loadings in the Nipple Butte IRA to the type of reference conditions that would have been seen without successful fire suppression, and which would allow fire to function naturally on the landscape.

The 2001 Roadless Area Conservation Rule states that (36 CFR 294.13(b)):

> **(1) The cutting, sale, or removal of generally small diameter timber is needed for one of the following purposes and will maintain or improve one or more of the roadless area characteristics as defined in § 294.11.**
>
> > **(i) To improve threatened, endangered, proposed, or sensitive species habitat; or**

**(ii) To maintain or restore the characteristics of ecosystem composition and structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period;**

The desired future condition is to improve habitat for Mid-Columbia River steelhead (threatened species) and Westslope cutthroat trout (Region 6 Sensitive species) in the Nipple Butte IRA, as described above.

In addition, the desired future condition is to restore the characteristics of ecosystem composition and structure within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period (36 CFR 294.13(b)(1)(ii)). Specifically:

- To move these PAGs in the Nipple Butte IRA within or towards HRV.
- To reduce the uncharacteristically high fuel loadings in the Nipple Butte IRA to the type of reference conditions that would have been seen without successful fire suppression, and which would allow fire to function naturally on the landscape.
- To reduce encroachment of western juniper and conifers into areas where they did not historically occur to improve big game forage, the quality of grassland for wildlife, the diversity and productivity of riparian plant communities, and water availability for native vegetation.
- To restore the water flow/storage patterns adjacent to Mid-Columbia River Steelhead Critical Habitat from current altered patterns related to encroachment of juniper and conifers in the IRA.

Applying mechanical treatments where possible, combined with prescribed fire, would move the Nipple Butte IRA towards desirable future conditions. Where mechanical treatments are not possible, exclusive use of prescribed fire would gradually move the IRA toward desired conditons.

The cutting, selling, or removal of timber from the IRA would occur through commercial thinning (alternatives 2 and 3), non-commercial thinning (alternatives 2 and 3), and felling of trees within aspen stands (alternatives 2, 3 and 4). The extent and amount of cutting, selling, or removal of timber varies with each alternative.

Generally small diameter timber is defined for the Magone Project as being relative to the size of trees within each treatment unit. The commercial and noncommercial thinning prescription would generally be from below, removing grand fir encroachment to protect the abundant large, old ponderosa pine and western larch within these stands. Commercial and non-commercial thinning would include trees 1 foot tall to 18 inches DBH, with an occasional tree up to 21 inches DBH. These trees are generally of small diameter because in areas proposed for commercial thinning, old trees range from 25 to 55 inches DBH, with a majority of them being between 25 to 40 inches DBH.

Non-commercial thinning would include trees 1 foot tall to 11 inches DBH through manual and mechanical methods. Approximately half of the non-commercial thinning would be removal of juniper encroachment and the other half would be removal of conifer encroachment to protect mountain mahogany, bitterbrush, grasses, and other browse species that provide important habitat to Rocky Mountain elk and mule deer. Non-commercial thinning would remove trees of generally small diameter and would leave larger trees as well as old growth juniper and ponderosa pine that range in size from 12 to 35 inches DBH.

Felling of trees within aspen stands would be completed for the purpose of removing conifer encroachment to protect existing aspen trees and stimulate suckering, as well as utilizing those trees for large woody debris within Clear, McClellan, and Thompson creeks (this activity is authorized under the 2014 Aquatic Restoration Decision (USDA Forest Service 2014b)). Aspen provides unique habitat for many wildlife species within coniferous forests, and it is currently much reduced from its historical extent. The overstory of most aspen stands on the Malheur National Forest is single-storied and even-aged with many close to the end of their natural life cycle. Conifer trees felled would be predominately ponderosa pine that range in size from approximately 14 to 21 inches DBH.

Trees greater than 21 inches DBH that do not exhibit old tree characteristics would occasionally be felled for large woody debris to meet Forest Plan standards that specify 20 percent of the large woody debris (80-120 pieces per mile) would be greater than 20 inches in diameter (LRMP Amendment 29). Trees that exhibit old tree characteristics would not be felled. Adding large woody debris into these streams would directly benefit Mid-Columbia River steelhead (threatened species) and Westslope cutthroat trout (Region 6 Sensitive species).

#### 1.4.1.5 Social Values and Opportunities

##### *Wood Products*

Wood products play an important role in the local economy by providing employment and revenue. Timber harvest has decreased since the 1990s and currently only one operating saw mill remains open in Grant County and Harney County.

The desired condition is to provide wood products to help maintain the existing lumber and forest products infrastructure and support local employment, providing for community stability. The Malheur Forest Plan includes direction to provide a sustainable flow of timber and associated wood products at a level that would contribute to economic stability and provide an economic return to the public (USDA Forest Service 1990a, page IV–2, Forest Goals 24–26). Implementation of the Magone Project would provide a variety of wood products, including sawlogs, biomass, and post and pole.

##### *Employment Opportunities*

The rural communities adjacent to the Malheur National Forest have relied on their natural resources of timber, agriculture, and ranching since their founding. Declining forest products and housing markets have greatly reduced employment and economic vitality in this region's small communities. Since the mid-1990s, Grant County and Harney County are consistently listed among the top three counties for unemployment in the State of Oregon. Currently (as of January 2015), Grant County is at 10.4 percent unemployment compared to Oregon state average 6.3 percent and the National average of 5.7 percent (Oregon Employment Department 2015).

The desired condition is to "[c]ontribute to the social and economic health of communities which are significantly affected by National Forest management" (USDA Forest Service 1990a, page IV–3, Forest Goal 42). Implementation of the Magone Project would provide local employment opportunities through vegetation, fuels, and aquatic restoration activities.

##### *Recreational Opportunities*

The most popular recreation activities on the Forest are driving for pleasure, hunting, hiking and walking, viewing wildlife, relaxing, primitive camping, and viewing natural features (National Visitor Use Monitoring, USDA Forest Service 2009b).

Although these recreation activities occur throughout the Forest, the Magone Lake recreation area provides some of the premier summer recreation opportunities, including camping, hiking and walking, viewing wildlife and natural features, picnicking, relaxing, swimming, and fishing for rainbow and brook trout. Magone Lake is the most significant recreation resource within the project planning area and the most popular developed recreation resource on the Blue Mountain Ranger District.

Although the Magone Lake recreation area provides the largest variety of recreation activities within the Magone project planning area, it does not provide the only recreation opportunities. The project planning area includes 61 dispersed recreation campsites, 7 miles of foot/horse/bicycle/off-highway vehicle (OHV) trails and many miles of primitive roads.

Dispersed camping occurs throughout the project planning area, but is most heavily concentrated in the eastern half. This is because the western half of the project planning area is dominated by the Nipple Butte IRA. Dispersed camping with motor vehicles is most popular along or near Forest Service roads (FSR) 18 and 36.

The Malheur Forest Plan objectives for dispersed recreation include constructing, reconstructing, and managing trails to protect the resources and meet the objectives of each recreation opportunity spectrum (ROS) class (USDA Forest Service 1990a, page IV-13). The Magone project planning area includes the semi-primitive motorized (42 percent of the project planning area), roaded natural (33 percent), and roaded modified (25 percent) settings where there is a low to moderate concentration of users and varying levels of evidence of other users. The desired future condition is to construct and manage trails to protect the resources in the area and meet the objectives of each ROS class.

The Malheur Forest Plan objectives for developed recreation (including Magone Lake) state that where the need is identified, upgrade, replace, and add facilities and consider the expansion or addition of new facilities where recreation demand and environmental concerns warrant (USDA Forest Service 1990a, page IV-14). The desired future condition is to upgrade, replace, and add facilities at the Magone Lake recreation area to enhance the recreational opportunities in the area.

### *Road System*

There are approximately 47 miles of open road in the Magone project planning area.[6] During project planning, field reconnaissance provided additional information regarding forest road conditions and needs. An interdisciplinary team reviewed all of the roads in the project planning area to identify management and recreational access needs, sedimentation concerns, and big game security needs.

The Malheur Forest Plan goals for road facilities are to plan, design, operate, and maintain a safe and economical transportation system that provides efficient access for the movement of people and materials involved in the use and protection of the National Forest System lands at the minimum level necessary to meeting resource objectives (e.g., timber harvest and removal, big-game habitat security needs, and recreation opportunities) (USDA Forest Service 1990a, page IV–3, Forest Goals 35 and 36).

[6] Open road miles are low in the Magone project planning area because 10,195 acres (38 percent) of the 27,000-acre Magone project planning area is located within the Nipple Butte Inventoried Roadless Area.

## 1.4.2 Need for Amending the Malheur Forest Plan

The proposed action and other action alternatives would require the following amendments to the Malheur Forest Plan, as amended.

### 1.4.2.1 Changes to Old Growth Boundaries

There are three areas related to old growth forest habitat for which Malheur Forest Plan standards were set. These are dedicated old growth habitats (DOGs), replacement old growth habitats (ROGs), and pileated woodpecker feeding areas (PWFAs). Within the project planning area, the number of acres set aside for each of these habitats is below thresholds set in the Forest Plan. The Forest Plan states that DOGs will be 300 acres, PWFAs will be 300 acres, and ROGs will be 150 acres for every 12,000 acres.

The Forest Plan standards for old growth habitats are identified for Management Area 13 (Malheur Forest Plan, pages IV-105, 106, Appendix G, and the Malheur Forest Plan FEIS), directing that old growth areas be distributed across the Forest to provide for wildlife species dependent on this forest type. The designation/expansion of suitable MA-13 old growth areas across the project planning area would improve the agency's ability to manage for pileated woodpecker, pine marten, three-toed woodpeckers, white-headed woodpeckers, and other late and old successional (LOS) dependent species. It is anticipated that habitat viability for pileated woodpeckers and pine martens would be maintained or increased via the proposed MA-13 network expansion and old growth in the cold and moist forest types.

The Forest Plan requires an assessment of old growth areas utilizing an interdisciplinary process to recommend boundary changes to better meet objectives. The proposed forest plan amendment would redraw Management Area 13 boundaries for existing areas and delineate boundaries for new areas within the project planning area to bring total acres up to Forest Plan standards.

### 1.4.2.2 Reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) Cover below Malheur Forest Plan Standards

This amendment is being proposed to allow the non-commercial thinning (which would remove juniper and other conifer cover) to enhance upland shrubs, while still providing cover from mahogany and increasing forage. Although the habitat effectiveness index (HEI) and cover requirements are meeting or exceeding Malheur Forest Plan standards, cover requirements are not always compatible with the historical range of variability. This conflict is apparent in the Hot Dry and Warm Dry forests dominated by ponderosa pine in the Magone project planning area. Historical conditions and fire return intervals favored large blocks of trees with canopy closure too low to support satisfactory or marginal cover. Today, cover requirements are being met on many ponderosa pine sites; however, stands are stocked at levels that are at a high risk to bark beetle attack and severe wildfires. Modeling results (FVS) suggest that cover levels may not be sustainable. This inherent conflict may be even more relevant in winter range, which is often located in low elevation, Hot Dry and Warm Dry forests dominated by ponderosa pine. Unfortunately, tree thinning, the treatment that most effectively reduces beetle and fire risk, also reduces the effectiveness of a stand as cover.

## 1.5 Management Direction

This DEIS tiers to the Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan) Final Environmental Impact Statement and Record of Decision (USDA Forest Service 1990b, 1990c) and incorporates by reference the accompanying land and resource management plan (Malheur Forest Plan) (USDA Forest Service 1990a), as amended. Additional management direction is provided by Forest Plan amendments approved since 1990, some of which include:

> "Columbia River Anadromous Fish Management Policy and Implementation Guide" (USDA Forest Service 1994; herein referred to as Amendment 29). The amendment included changes to both Management Area 3A (inland fish habitat) and 3B (anadromous fish habitat).
>
> "Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and Portions of Nevada" (USDA Forest Service 1995c; also known as INFISH). This amendment provides riparian goals, management objectives, and standards and guidelines that reduce the risk of loss of populations of inland fish and potential negative impacts to aquatic habitat.
>
> "Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California" (USDA Forest Service and USDI Bureau of Land Management 1995; also known as PACFISH). This amendment provides riparian goals, management objectives, and standards and guidelines that reduce the risk of loss of populations of anadromous fish and potential negative impacts to aquatic habitat.
>
> The Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, herby referred to as the R6 2005 Invasive Plant FEIS. The R6 2005 Invasive Plant FEIS culminated in a Record of Decision (USDA Forest Service 2005a; R6 ROD) that amended the Malheur Forest Plan by adding management direction relative to invasive plants and released all National Forests from direction established by the 1988 ROD and Mediated Agreement for invasive plant management. Parts of the 1988 ROD and 1989 Mediated Agreement for unwanted native plants were not affected by the R6 2005 ROD.
>
> "Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales" (USDA Forest Service 1995a; also known as Regional Forester's Eastside Forest Plan Amendment 2 or Eastside Screens).

The project identified in this DEIS is being proposed to meet appropriate forest-wide goals and standards (pages IV-1 to IV-45) and to comply with management area goals and standards (pages IV-46 to IV-139) of the Malheur Forest Plan.

This document also incorporates by reference the Decision Notice for Aquatic Restoration (Aquatic Restoration Decision) (USDA Forest Service 2014b) and Malheur National Forest Aquatic Restoration Environmental Assessment (USDA Forest Service 2014a). The Decision Notice for Aquatic Restoration was signed September 30, 2014, and proposes aquatic restoration on those private and public lands within the boundary of the Malheur National Forest and/or adjacent lands where restoration activities would aid in the recovery of aquatic species and impaired water bodies.

The Decision Notice provides a consistent methodology to design, implement, monitor, and document watershed and aquatic restoration activities on the Malheur National Forest. Some or all of the aquatic restoration activities described under the proposed action in this document may ultimately be authorized using the Project Implementation Checklist form process established by this decision.

This document also incorporates by reference the Record of Decision for the Malheur National Forest Site-Specific Invasive Plants Treatment Project (USDA Forest Service 2015b) and Malheur National Forest Site-Specific Invasive Plants Treatment Project Final Environmental Impact Statement (USDA Forest Service 2015a). This decision authorizes a range of treatment and restoration methods for an integrated weed management program.

### 1.5.1 Relationship to the Aquatic Restoration Decision

The Malheur National Forest initiated an Aquatic Restoration Environmental Assessment (EA) in January 2014, and the decision notice and finding of no significant impact (DN/FONSI) was signed in September 2014. This decision allows activities that are consistent with the 17 aquatic restoration categories described in that decision to be implemented following review of the activity with a Project Implementation Checklist to ensure the activity is consistent with the analysis and is within the criteria of the Aquatic Restoration Decision. Some of the activities identified by the Magone interdisciplinary team in the Magone project planning area are aquatic restoration actions that are authorized by the Aquatic Restoration Decision. Please see the following website for information on future Aquatic Restoration Projects on the Malheur National Forest:
http://www.fs.usda.gov/detailfull/malheur/landmanagement/?cid=STELPRD3817723&width=full

This webpage is designed to provide information about aquatic restoration activities on the Malheur National Forest, and will provide an annual list of projects planned for implementation by each Ranger District as well as an accomplishments section where the interested public can learn about completed projects. The list and description of projects to be implemented each summer will be posted on this website each spring and at least 30 days prior to planned implementation. Projects may also be posted and implemented at other times of the year. A Project Implementation Checklist will be used on each project to ensure all activities are consistent with the Malheur Forest Plan and project design criteria associated with the Aquatic Restoration Decision.

### 1.5.2 Forest Plan Management Areas

Management direction is found within the resource prescriptions of the Malheur National Forest Land and Resource Management Plan (USDA Forest Service 1990a). The Malheur Forest Plan (chapter IV) provides overall direction to meet desired conditions by identifying management goals and objectives to reflect conditions on the ground. The Malheur Forest Plan management areas (MA) are used to guide the type and intensity of management activities that may occur on the Forest. The Magone project planning area falls within 10 MAs as described in Table 2. A map showing these areas can be found in Appendix B – Project Maps, Map 2. There are some management areas that overlap, so the total acreage is greater than the size of the project planning area.

**Table 2. Malheur Forest Plan management areas within the Magone project planning area**

| Management Area | Acres* | Malheur Forest Plan goals |
|---|---|---|
| General Forest (MA-1) | 8,700 acres | Manage for timber production and other multiple uses on a sustained yield basis. |
| Rangeland (MA-2) | Included in MA-1 | Manage for livestock forage production and other multiple uses on a sustained yield basis. |
| Riparian Areas (MA-3)/riparian habitat conservation areas (RHCAs) | 4,200 acres | Manage to protect or enhance riparian-dependent resources in watersheds supporting anadromous fish. Acres for this MA are measured using RHCA buffers. |
| Big-Game Winter Range Maintenance (MA-4A) | 4,000 acres | Maintain or enhance the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management practices. Manage for elk habitat by balancing cover quality, cover spacing, forage, and open road densities. |
| Special Interest Area – Magone Geological Area (MA-8) | 200 acres | Manage and preserve areas of significant historical, geological, botanical, zoological, paleontological, or other special characteristics. To protect and, where appropriate, foster public enjoyment of these areas. |
| Developed Recreation Area (MA-12) | 300 acres | Manage for developed recreation opportunities, providing interpretation and enhancement of cultural and natural resources. |
| Old Growth Habitat (MA-13) | 800 acres | Provide “suitable” habitat for old growth dependent wildlife species, ecosystem diversity, and preservation of aesthetic qualities.<br>Manage old growth for wildlife and plant habitat, ecosystem diversity, and aesthetic quality. Dedicated old growth areas are managed to provide old growth characteristics for dependent wildlife species. Replacement old growth areas are managed to provide future old growth habitat. |
| Visual Corridors (MA-14F – Foreground)<br>Visual Corridors (MA-14M – Middleground) | 4,500 acres<br>100 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. |
| Wildlife Emphasis Area (with Non-Scheduled Timber Harvest) (MA-21) | 4,800 acres | Manage to provide high quality fish and wildlife habitat and water quality. Manage elk habitat to provide at least 70% elk habitat effectiveness. Timber harvest will be on a non-scheduled basis and used only to meet fish or wildlife habitat objectives. Provide opportunities for high quality semi-primitive dispersed recreation. |

*Because some management areas overlap, the total acreage is more than the project planning area.

### 1.5.3 Laws and Regulations

The management of timber and aquatic resources on National Forest System lands is 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 the National Forest Management Act of 1976; the National Environmental Policy Act (NEPA) of 1969, including the Council on Environmental Quality regulations for implementing NEPA (40 CFR §§ 1500 1508, July 1, 1986); the Endangered Species Act 1973, as amended; the Magnuson-Stevens Fishery Conservation and Management Act 1976, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267); 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; and Executive Order 13186.

## 1.6 Proposed Action

The Forest Service is proposing a suite of activities to meet the purpose and need for action: silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities. A more detailed description of these activities can be found in Chapter 2, Appendix A – Project Activity Tables, and Appendix B – Maps.

## 1.7 Decision Framework

The Forest Supervisor of the Malheur National Forest is the responsible official who will review the proposed action, the alternatives to the proposed action, and the environmental consequences to make a decision. The decision should contain activities that best meet the purpose and need, desired future condition, and provide consistency with Malheur Forest Plan standards and guidelines for all related resource areas. The decision would include design criteria necessary for the activities to take place and provide resource protection. The Forest Supervisor will decide whether to:

- Select one of the action alternatives that has been considered in detail, or
- Modify the selected alternative, and
- Identify what mitigation measures would apply, or
- Select the no action alternative.

If only a portion of activities from one of the action alternatives is selected, or a combination of activities from multiple action alternatives is selected, then the Forest Supervisor will decide whether to amend the Malheur Forest Plan.

## 1.8 Public Involvement

The Magone Project was listed in the Malheur National Forest Schedule of Proposed Actions (SOPA) beginning in October 2014, and has been in subsequent quarterly SOPAs. This document is mailed to individuals and is available on the internet (http://www.fs.fed.us/sopa/forest-level.php?110604) for those who are interested in activities proposed on the Malheur National Forest.

The Notice of Intent (NOI) to prepare an environmental impact statement was published in the Federal Register on February 13, 2015. This notice initiated the 30-day scoping period. A legal notice was also published in the Blue Mountain Eagle on February 11, 2015, providing notification of the Magone Project scoping period.

A scoping package was sent to approximately 150 individuals, groups, federal and state agencies at the same time the scoping notice was published. Twenty-six (26) comments were received in response within the 30-day scoping period. The legal notice, letters, a radio spot on the local KJDY radio station, and the Forest's website included an invitation to a public meeting on February 24, 2015, which approximately 25 people attended. The Forest Service response to the comment letters received during the scoping period can be found in Appendix D – Scoping Report and public meeting notes can be found in the project record.

### 1.8.1 Scoping

During scoping in the preparation of this DEIS, public input was sought and comments received were assessed and considered both individually and collectively. Along with the individual comments, agency responses to these comments are found in the project record. Input from the public assisted the Forest Service in developing the proposed action and other action alternatives.

## 1.9 Issues

Issues are points of discussion, debate, concern, or dispute about environmental or social effects that may occur as a result of the proposed action. Issues provide focus and influence alternative development, including development of mitigation measures to address potential adverse effects. Issues are also used to compare the effects between the proposed action and the alternatives regarding a specific resource element. Issues are generally divided into key issues and analysis issues.

### 1.9.1 Key Issues

Key issues are those that represent a point of debate or concern that cannot be resolved without consideration of the trade-offs involved. These issues spur the design of alternatives to the proposed action that provide a different path to achieve project objectives. Trade-offs can be more clearly understood by developing alternatives and displaying the relative impacts of these alternatives weighed against the proposed action.

**Level and effects of silviculture treatments** – A wide variety of comments were received on the topic of silviculture treatments and prescribed burning, some requesting that the Forest Service analyze an alternative that includes more commercial harvest and some requesting an alternative with less commercial harvest and prescribed burning. Measures: percentage change of structural stages in relation to the historical range of variability (HRV); percentage change of acres above the management zone (MZ), within the MZ, and below the MZ as defined by maximum stand density index (MaxSDI); acres mechanically treated; viability of harvest; employment and income; economic efficiency; and million board feet (MMBF) harvested.

**Recreation developments** – A wide variety of comments were received on the topic of the level, type, and location of recreation developments. Some individuals were in favor or opposed to bicycle trail developments and changes to the Magone Lake Recreation Area. Measures: impacts to recreation opportunity spectrum (ROS) classes, recreation opportunities, and public access to recreation.

**Impacts to the Nipple Butte Inventoried Roadless Area (IRA)** – Some comments were received requesting more active management within the Nipple Butte IRA, while others requested less or no silviculture treatments, prescribed burning, or other project activities occur within the Nipple Butte IRA. Measures: impacts to roadless area characteristics, acres and type of silviculture treatments, acres and type of prescribed burning, miles of hiking/bicycle trails within the Nipple Butte IRA.

### 1.9.2 Analysis Issues

Analysis issues are environmental components that are considered in the Chapter 3 analysis. These issues are used as a way to compare the alternatives. These issues: 1) are generally less focused on the elements of purpose and need, than are the key issues; 2) reflect the discussions of the effects of the proposed activities to those resources; and 3) are important for providing the responsible official and public with complete information about the effects of the project.

**Fire, Fuels, and Air Quality** – Whether proposed activities would reduce the fuel loading in the project planning area by reducing the density of standing vegetation, surface fuels, and/or ladder fuels. Smoke from prescribed burning would contribute to short-term decreased air quality and visibility. Measures: fire hazard, fuel loadings, crown fire potential, fire regime, and air quality. Finding: Whether the project meets the Clean Air Act and State and Federal air quality standards.

**Soils** – The amount of soil disturbance caused by project activities that require ground-based equipment. Disturbance could include compaction, displacement, and exposure of the mineral surface to erosion due to the removal of ground cover. Measure: compliance with Malheur Forest Plan.

**Watershed** – The proposed activities may impact hillslopes (including ephemeral swales); riparian habitat conservation areas (RHCAs) and Management Area 3B (including wet areas, ephemeral draws, and valley bottoms); stream channels (and ephemeral draws); water quantity, timing, hydrology response, and ground water; water quality; and watershed hazard. Measures: acres of ground disturbing harvest and qualitative rating of watershed hazard (very low to very high).

**Aquatic Species** – The proposed activities may impact pool frequency, water temperature and stream shading, large woody debris, bank stability, wetted width to depth ratio, embeddedness, shade and canopy closure. Measures: pool frequency, water temperature, shade, large woody debris/coarse woody debris per mile, fine sediment/embeddedness, width to depth ratio, and bank stability. Findings: effects determinations for threatened, endangered, Region 6 sensitive species, and Malheur Forest Plan management indicator species.

**Wildlife** – The proposed activities may impact proposed, endangered, threatened, Region 6 sensitive, Malheur Forest Plan management indicator species, Malheur Forest Plan featured species, and landbirds including neotropical migratory birds. Measures: effects to proposed, endangered, threatened, Region 6 sensitive, Malheur Forest Plan management indicator species, Malheur Forest Plan featured species, and landbirds including neotropical migratory birds and their habitats. Findings: effects determinations for proposed, endangered, threatened, Region 6 sensitive, Malheur Forest Plan management indicator species, Malheur Forest Plan featured species, and landbirds including neotropical migratory birds.

**Botanical Resources** – The proposed activities may impact threatened, endangered, Forest Service Region 6 sensitive plant species, Malheur Forest Plan management indicator species, and species of concern and their habitat. Measures: impacts to proposed, endangered, threatened, and Region 6 sensitive species, sensitive plant habitat types, other plant species of conservation concern, and culturally significant plant species.

**Non-native Invasive Plants** – Soil exposure from project activities may provide habitat for non-native invasive plants. There is the potential for the spread of existing noxious and invasive plant populations by harvest equipment. Measure: risk of spread from ground disturbance.

**Range** – Some project activities may detrimentally impact forage production. Measure: change in forage production.

**Heritage** – Some project activities could affect the quantities of cultural resources which make them eligible or potentially eligible for listing on the National Register of Historic Places. Measure: adverse effects to historic properties and whether project design criteria have protected historic properties from adverse effects. Finding: Whether the project meets the National Historic Preservation Act.

**Roads** – Whether proposed activities would provide for a safe road system that meets current public access, recreational opportunities, and resource management objectives. Measures: miles of open and closed roads after project completion.

**Visuals** – Some project activities may impact visual quality objectives (VQOs). Finding: Whether the project meets the VQOs.

**Other Undeveloped Lands** – Commercial timber harvest, road construction, and mechanical fuel treatment may impact the undeveloped character of these areas. Measures: Acres of other undeveloped lands that meet the identification criteria after implementation of each alternative, intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.), and intrinsic social values (apparent naturalness, solitude, remoteness).

**Climate Change** – The effects proposed actions may have on climate change, and the effects of climate change on the project planning area.

## 1.10 Project Record Availability

This DEIS hereby incorporates by reference all appendices and the project record. The project record contains specialist reports, biological evaluations, and other technical documentation used to support the analysis and conclusions in this DEIS. Relying on specialist reports and the project record helps implement the CEQ Regulations' provision that agencies should reduce NEPA paperwork (40 CFR 1500.4). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the proposed action and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere.

The project record is available for review at the Blue Mountain Ranger District, John Day, Oregon.

The specialist reports that are part of the project record and incorporated by reference are:

- Aquatic Resources Report
- Botanical Resources Report and Plant Biological Evaluation
- Economic Report
- Fire, Fuels, and Air Quality Report
- Heritage Resources Report
- Inventoried Roadless Areas and Other Undeveloped Lands Report
- Non-native Invasive Plants Report
- Range Report
- Recreation Report
- Roads Report
- Silviculture Report
- Soils Report
- Wildlife Biological Evaluation (BE) for Proposed, Endangered, Threatened, and Sensitive Species and Terrestrial Wildlife Report
- Visuals Report
- Watershed Report

# Chapter 2. Alternatives, Including the Proposed Action

## 2.1 Introduction

This chapter describes and compares the alternatives considered for the Magone Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social, and economic effects of implementing each alternative.

## 2.2 Alternatives Considered in Detail

The Forest Service developed four alternatives, including the no action and proposed action alternatives, in response to issues raised by the public.

### 2.2.1 Alternative 1 – No Action

Under the no action alternative, current management plans would continue to guide management of the project planning area. No silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, or Magone Lake restoration activities would be implemented to accomplish project goals.

### 2.2.2 Alternative 2 – Proposed Action

#### 2.2.2.1 Modifications to the Proposed Action

The modifications to the proposed action that was scoped to the public are:

- The acreages of the silvicultural treatments changed some from what was scoped to the alternative described in this document; however the treatment types remain the same.
    - The greatest change in acres is under the non-commercial thinning treatment type, where acres were added to allow juniper and conifer felling and removal both inside and outside the Nipple Butte Inventoried Roadless Area (IRA).
- Additional information was added regarding the activity fuels treatment type and harvest method (i.e., tractor and/or skyline) associated with the silvicultural treatments.
- Addition of 18 acres of conifer reduction in aspen stands.
- Reduction of 7.3 miles of road maintenance for haul and an increase of 0.3 miles of temporary road construction.
- The miles of currently open road (ML 2) to be closed (ML 1) under the project decreased by 1.2 miles.
- The miles of proposed decommissioning was reduced by 0.82 miles (3 road segments) because decommissioning of currently closed roads (ML 1) is already authorized by the Aquatic Restoration Decision.

- The location of hiking/bicycle trail proposals was altered in response to comments. Many of the trails located in the southern part of the Nipple Butte IRA and within the Nipple Butte Wildlife Emphasis Area (WEA) were dropped due to public comments expressing concerns about impacts to resources in this area (Clear Creek, Fenceline, High Ridge, Porcupine, Prohibition, and Thompson Creek trails). Trails are alternately proposed more in the eastern part of the Magone project planning area (Four Corners, Camp Lick Connector, Low Slope, North Magone Connector, Round Top, and Tinker Creek trails). In addition, the location of a portion of the Behind Magone trail was altered to avoid impacts to a range water development in the area.
- Instead of relocating the existing Nipple Butte trail, the Jugow trail would be constructed and the Nipple Butte trail would remain on the system to maintain off-highway vehicle (OHV) and other use on that trail.
- Added an Americans with Disabilities Act (ADA) accessible trail along a portion of Magone Lake trail.
- Proposals to improve the existing Nipple Butte and Tinker Creek trailheads and construct a new trailhead at Four Corners was added to the proposal to complement the trail development proposals.
- Additional locations and information about the interpretive signs was added.

#### 2.2.2.2 Silviculture Treatments

The following silviculture treatments would be implemented under alternative 2.

**Commercial and non-commercial thinning (3,307 acres, 77 units)**: This prescription is recommended when the existing stand is overstocked to the point where tree vigor is declining, predisposing the stand to insect attack and uncharacteristic fire events that can occur due to buildup of fuels and crown density.

In Warm Dry ponderosa pine stands, variable density thinning is generally to be applied from below. Smaller trees would be removed and larger trees retained. Leave patches would comprise 5 to 15 percent of a unit, and openings would be created that are ¼ to 2 acres in size to mimic historical fire patterns. A follow-up non-commercial thinning would occur where there are sufficient small trees remaining after commercial thinning.

Past harvest and fire suppression activities have led to a shift in species composition compared to historical conditions. Oregon Lumber company owned and managed a majority of the property outside of the Nipple Butte IRA until the 1940s. Fires in the area have been suppressed, keeping most of them small. This has led to an abundance of ingrowth of young stands that are more dense than what would have occurred naturally. Thinning activities would remove species that would historically have been a smaller percent of these stands, and allow the pine and larch components to start filling their previous niche.

An important aspect of thinning throughout the project planning area is to reduce fuel loading along major routes of travel to and around the Magone Lake recreational facility. There are also approximately 27 miles of common boundary with private land in the project planning area, so thinning stocking levels to a point where crown fires would be less likely could prevent large fires from spreading quickly between ownership boundaries.

- ***Mountain mahogany and bitterbrush***: Some commercial and non-commercial thinning units have existing populations of mountain mahogany and bitterbrush. Thinning the competing conifer encroachment would help release these browse species.

- ***Aspen***: Some commercial and non-commercial thinning units have existing populations of aspen. Conifers that have encroached into the aspen stands and are competing with the aspen would be thinned to release the aspen.

**Commercial and non-commercial thinning, leave stand denser (778 acres, 14 units)**: Some commercial thinning in areas of importance for elk would be thinned to a heavier stocking level for cover retention. Openings of ¼ to 2 acres would be created to encourage growth of forage species. Treatment would be similar to the commercial and non-commercial thinning, except the total basal area remaining would range between 100 to 120 square feet to the acre, as compared to 50 to 80 square feet to the acre being left with most other thinning treatments.

**Commercial and non-commercial thinning, with re-designation from dedicated old growth (DOG) to replacement old growth (ROG) (223 acres, 4 units)**: These stands currently do not represent old growth with characteristics described in the Malheur Forest Plan. Re-designating the stands to replacement old growth would make the stands "suitable" for management towards Old Growth through treatment under Malheur Forest Plan guidelines. Proposed activities would help develop old growth characteristics within the stands. The treatment for the stands currently selected for re-designation would be the same as described under commercial and non-commercial thinning.

**Post and pole removal (378 acres, 6 units)**: In Warm Dry areas of lodgepole pine, grand fir, and ponderosa pine, the prescription would be to thin from below, retaining the older trees, and removing posts and poles that are currently competing with older ponderosa pine in the stands.

**Non-commercial thinning (6,148 acres, 177 units)**: The objectives of non-commercial thinning are to reduce ladder fuels and to increase growth and vigor of remaining trees. The prescriptions for non-commercial thinning would favor a mix of early seral and late seral trees to promote the desired future species composition of the stands.

Non-commercial thinning consists of treating non-merchantable sized trees (1 foot tall to 11 inches diameter at breast height [DBH]) that do not meet commercial tree standards through manual and mechanical methods. Excess slash not utilized for products such as biomass and pole material, or not used in stream enhancement projects, would be hand piled and burned. Non-commercial thinning may occur in areas that are also commercially thinned as described above.

These units include juniper removal treatment units with shallow soils; the following slash treatment description would be followed after thinning activities are complete:

1. Piling of thinning slash would take place until 7 to 10 tons per acre of slash remain in the treatment unit.
2. Piles would primarily be constructed from material in the zero to 8 inch size class on the large end.
3. Tree boles, tree tops, and remaining limbs making up the 7 to 10 tons per acre of residual slash would be distributed in the unit to assist with slope stability.
4. Scattered slash remaining in the treatment unit would be no more than 24 inches above ground level.
5. Slash piles would meet normal piling standards (6 feet by 6 feet by 5 feet) with some larger piles being constructed for wildlife habitat enhancement. These larger piles would not be burned.
6. To protect highly erodible soils, no heavy equipment would be used for piling unless the unit is covered with no less than 12 inches of packed snow.

7. To the extent practicable, piles would be placed so as to minimize damage to ground cover, especially living plants. This would help protect highly erodible soils.
8. To the extent practicable, piles would be burned under conditions that would limit the likelihood of the pile being 100 percent consumed. This would help to protect highly erodible soils.

**Non-commercial thinning, with designation as ROG (1,039 acres, 5 units)**: Stands designated as ROG have some old growth characteristics. Proposed activities would help develop old growth characteristics within the stands. Treatments in theses stands would be the same as described under non-commercial thinning.

**Conifer reduction in aspen stands (18 acres, 7 units)**: Seven (7) aspen stands of various sizes have been identified for restoration treatments comprising approximately 18 acres. Individual units are listed in Appendix A – Project Activity Tables. See also Appendix B, Map 3. Three actions are proposed to protect aspen stands and improve aspen regeneration and vigor: 1) thin conifer trees that have grown into aspen stands to reduce competition for light and water, 2) construct fences around aspen stands to reduce grazing pressures from livestock and wildlife, and 3) underburn in the aspen stands that are in or next to a prescribed burning unit.

Conifers would be felled up to within 150 feet of aspen suckers to encourage expansion of the stands. Conifers felled within riparian habitat conservation areas (RHCAs) would be felled into streams where feasible, left within the RHCA, or transported off-site for watershed restoration projects. Some trees cut from aspen stands that are outside of RHCAs and within commercial thinning units could be harvested as merchantable logs. Some conifers would be girdled and left as snags. Smaller diameter trees and slash would be hand piled and burned or left to provide a protective barrier from livestock and wildlife grazing. Encroaching lodgepole pine would be felled and may be used to construct buck and pole fences around aspen stands. The thinning and fencing would be done on a larger area than the existing stands with the objective to expand the current stands.

When prescribed burning is implemented in the project planning area, the underburning would be allowed to back into some aspen stands. The underburning of an aspen stand would only occur if that stand is associated with a proposed prescribed burning unit and after it has been fenced to exclude browsing of the new suckers. Aspen stands would be enhanced by prescribed burning, which would stimulate new growth of aspen trees.

**Biomass removal (up to 8,954 acres)**: Many units proposed for silvicultural treatments described above might have enough small diameter material to be considered for biomass utilization. The potential for biomass removal is analyzed for all treatment units. Biomass can be defined as pieces that are not large enough to have commercial sawlog value. Biomass removal from any specific unit would follow the guidelines of the designated prescription. This material may be used for pulp chips, co-generation of electricity, commercial fuel pellets, post and poles, and other non-traditional uses. This material may be removed during logging operations, by hand, or with small equipment such as all-terrain/utility-terrain vehicles, or small excavators or forwarders. For the most part, existing woody material on the ground is not suitable for biomass utilization and would be left on site for nutrient input to the soil or would be piled and burned if in excessive amounts. Efforts would be made to stimulate local markets by utilizing woody biomass generated by this project rather than dispose of it by burning. Utilization is limited by the marginal economics of the products to areas accessible by ground based skidding.

**Harvest Systems/Activity Fuels Treatments**: Cut trees would be yarded to landing zones via tractor or skyline depending on topography. Skid trails, skyline corridors, and landing locations up to 1 to 2 acres in size would be determined before logging and are subject to approval by the sale administrator. In landing zones the vegetation would be cleared for equipment to prepare, deck, and load trees for hauling. No landing zones would be located within RHCAs. The areas proposed for commercial thinning (4,686 acres, 101 units) would be yarded via tractor, skyline, or a combination as follows:

- Tractor – 3,677 acres, 82 units
- Skyline – 333 acres, 8 units
- Tractor and skyline – 676 acres, 11 units

Harvest systems and associated fuel treatments would occur as follows:

- Whole tree yarding and/or cut to length, grapple piling and/or hand piling, and pile burning* – 4,686 acres, 101 units
- Grapple piling and/or hand piling with pile burning – 4,381 acres, 111 units
- Hand piling with pile burning only – 2,945 acres, 77 units

*Units that are commercially treated would have the option to be either whole tree yarded or cut to length, and either grapple piled or hand piled. In order to move toward performance based contracting, the contractor, with Forest Service oversight, would be allowed to determine the most appropriate logging method and fuels treatment to meet contract specifications (e.g., design criteria such as soil compaction or tons per acre of fuel left).

See Appendix B, Map 3.

#### 2.2.2.3 Prescribed Burning and Unplanned Ignitions

The primary objective of prescribed burning is to restore and maintain an ecosystem that will thrive with the recurring disturbance of wildfire within the planning area. Prescribed burns are designed to reduce and maintain fuel loadings, leading to a decreased probability of catastrophic wildland fire occurring. Specifically, this means a reduction in surface fuels, duff/litter depth, ladder fuels, crown bulk density, and an increase in canopy base heights. Prescribed burning would also be used to stimulate the growth of aspen and other fire-adapted vegetation. Both mechanically treated and untreated stands would be exposed to prescribed burning as fire is re-introduced into the project planning area. Treated stands would see a combination of burning piled material and underburning. Those stands not being mechanically treated would be managed primarily with the use of prescribed burning. As conditions and stand characteristics allow, unplanned ignitions within the planning area would be used to meet the objectives of prescribed burning.

- Underburning up to 28,500 acres. This includes approximately 1,400 acres outside of the project planning area boundary (see map). Expanding these prescribed fire boundaries to natural fuel breaks increases firefighter safety and limits resource damage created by constructing new containment lines.
    - Prescribed burning would be conducted primarily in the spring or fall on up to 28,500 acres. However, the effects of climate change could create environmental conditions suitable for prescribed burning during the winter or summer as well (Table 3). Unplanned ignitions may be used like prescribed fire during any season when fuel loading and weather conditions are appropriate.

  - Up to 9,600 acres of underburning would be within designated wildland-urban interface. This includes 300 acres outside the project planning area boundary.
- Pile burning in silviculture treatments units would include up to approximately 12,000 acres. Acres that are pile burned are also included in (i.e., overlap with) the total underburning acres.

Table 3 shows the acreages for the burn blocks. See Appendix B – Maps, Map 6 for a map of the location of various burn blocks in the Magone project planning area.

**Table 3. Alternative 2 prescribed burn blocks**

| Burn block | Acres | Season of planned ignitions* |
|---|---|---|
| Block 1 | 1,400 acres | Winter, spring, summer, or fall |
| Block 2 | 7,400 acres | Winter, spring, summer, or fall |
| Block 3 | 2,700 acres | Winter, spring, summer, or fall |
| Block 4 | 1,000 acres | Winter, spring, summer, or fall |
| Block 5 | 3,600 acres | Winter, spring, summer, or fall |
| Block 6 | 6,300 acres | Winter, spring, summer, or fall |
| Block 7 | 4,900 acres | Winter, spring, summer, or fall |
| Block 8 | 1,200 acres | Winter, spring, summer, or fall |
| **Total** | **28,500 acres** | ***unplanned ignitions can be used any season** |

### 2.2.2.4 Road Activities

Roads would be utilized in the project planning area to provide access for treatment activities. General road maintenance, temporary road construction, temporarily opening closed roads for log haul, closing currently open roads, closing currently open roads and co-designating as trails, converting a road to a trail, and decommissioning a road are proposed. Temporary road construction and temporarily opening closed roads would occur to provide adequate access for harvest and fuel reduction treatments. See Appendix B, Maps 3 and 8.

#### *Road Use, Road Maintenance, and Temporary Road Construction*

**Road maintenance for haul (77.7 miles, 78 road segments)** would occur on open or temporarily opened roads to provide safe access and adequate drainage. The following work is classified as maintenance: blading and shaping the roadbed, reshaping drain dips or grade sags, reshaping waterbars/cross ditches, spot rocking in the roadbed, brushing and removing danger trees, removing snow, minor realigning of road junctions, cleaning culverts, seeding, removing excess material from the roadbed, placing fill material in ruts in the road, and installation of minor drainage features. Some county roads would also need to be used for haul.

**Closed roads to be temporarily opened for haul (28.7 miles, 45 road segments)**: These roads would be temporarily opened for log haul, and then closed at the completion of the project. The closure would remain consistent with the intent of the original closure. Basic custodial maintenance would be performed to allow for future access and to prevent damage by maintaining adequate drainage. Their mileage is included above under road maintenance.

**Temporary road construction (8.5 miles, 29 road segments)** would be necessary to access several timber harvest units. Temporary roads would be rehabilitated after use. Rehabilitation would eliminate future use of the road with the objective of restoring hydrological function.

Temporary roads would be restored by some combination of the following to ensure that the road has adequate drainage and ground cover to prevent erosion, soil productivity is restored, the road is no longer drivable, and the road is not highly visible after approximately 5 years:

- Waterbarring as needed to restore natural drainage patterns.
- Recontouring slopes (removing cut and fill slopes) and pulling berms from the edge of the road back onto the road.
- Subsoiling (loosening) compact soils in a "J" pattern to a depth of approximately 16 inches (unless prevented by bedrock or rock content of soils).
- Planting or seeding disturbed areas with genetically appropriate native species that naturally occur in the project planning area to achieve a minimum of 35 percent ground cover.
- Placing slash, boulders, and logs on the roadbed (where available).
- Disguising the visible entrance with pieces of cull logs, tops of cut trees, and/or rocks, etc. to prevent vehicle use.

There would be no construction of new or temporary roads outside the project planning area.

**Use of private roads to access silviculture units**: There are several roads where easements exist or may be needed through private land where access would be needed to implement this project.

See Appendix B, Map 3.

### *Road System Changes*

**Road decommissioning (0.3 miles, 1 road segment)**: FSR 1800-933 is a currently open road that is not needed for future management and is proposed for decommissioning. There is no evidence of a designed roadway past the dispersed campsite. The segment of this road past the dispersed campsite would be permanently removed from the Forest transportation system. This road would be allowed to continue to naturally re-vegetate itself, with no on-the-ground work proposed.

**Close currently open roads (maintenance level [ML] 2 to ML 1) (1.1 miles, 4 road segments)**: Closure of roads desired to be kept on the system would occur, but road use would be limited to infrequent management and other permitted activities. Closure may be by a physical barrier or gate, or by regulation. Basic custodial maintenance would be performed for future resource access, to prevent damage. Closed roads are to be left in a stable hydrologic state and are to be periodically maintained.

Several roads are grown closed or are not being maintained as open. These are being proposed to close as the result of non-use.

**Close currently open road (ML 2 to ML 1) and co-designate as a trail and ML 1 road (1.4 miles, 2 road segments)**: Several segments of road are proposed to be designated for use as both a road and trail.

**Convert road to trail (ML 1 to trail) (1.2 miles, 1 road segment)**: One segment of currently closed road in the Nipple Butte IRA is proposed to be converted for use solely as a trail.

**Co-designate existing road as a trail (4 miles, 8 road segments)**: Several segments of current open (ML 2) and closed (ML 1) road are proposed to be co-designated as part of the hiking/bicycle trail system.

See Appendix B, Map 8.

### *Rock Pit Material Sources*

Some roads may require rock for spot rocking wet areas. Rock pit material sources are located at, but not limited to:

- FSR 3940-794 – Township 11 South, Range 31 East, Section 32
- FSR 3946-085 – Township 11 South, Range 31 East, Section 8
- FSR 3940-590 – Township 11 South, Range 31 East, Section 17
- FSR 3945-196 – Township 11 South, Range 31 East, Section 19

## 2.2.2.5 Recreation Opportunity Improvements

The following recreation opportunity improvements would be implemented under alternative 2.

### *Trail Developments*

**Hiking/Bicycle Trails**

The objective is to meet the current public needs for a more broad recreation experience while on the Malheur National Forest by creating and maintaining a variety of trail systems in the Magone project planning area.

The expanded trail system would be centered around the Magone Lake developed area, which would be a starting point for campers and day-use visitors. There are several connecting trail options to provide for longer hikes, varied returns, and a more broad recreation experience. Outside of the Nipple Butte Inventoried Roadless Area (IRA), development would include extending existing bicycle trails on currently closed roads and utilizing some open roads, as well as constructing new trails primarily for the purpose of connecting the trails that follow roads. The aim here is to create worthy destinations and loop opportunities. This portion of the proposal also includes relocating an access point and constructing a portion of trail associated with the move. In addition, some obstacles such as trees and boulders would be placed in existing trails that were roads to create more of a single-track experience. Within the IRA, single-track bicycle trails would be constructed to create a “destination” single-track bicycle riding opportunity. Trails would primarily follow ridge lines. There would be a small number of drainage crossings. These trails would also provide loop opportunities, as well as tie the Nipple Butte trail into the Magone trail system. The existing Nipple Butte multiple-use trail would be improved as well.

Extensions to the existing hiker trails would be constructed to enhance the recreational opportunities for Magone Lake visitors. They would provide for longer hikes with loop opportunities, interpretation of Magone’s history and ecology, and access to an overlook area with views to Magone Lake, the Vinegar Hill-Indian Rock Scenic Area, the Strawberry Mountain Range, and the Aldrich Mountains.

New construction of single-track trails within the Nipple Butte IRA would also connect with the existing bicycle trails and the other newly constructed trails. All of the trails would be single-track bicycle and hiker trails with measures to prevent any off-highway vehicle (OHV) use.

The new construction portions of the bicycle trails would be constructed to meet single-track mountain biking trail standards, as specified by the International Mountain Biking Association (IMBA).

These are defined by IMBA's fundamental elements of a sustainable trail, which are it does not harm the environment, it meets the needs of visitors, it has small maintenance costs and it minimizes conflicts between different user groups. IMBA's trail building principles, which support the fundamental elements of building sustainable trail, would be implemented. The trail building principles that would be used include creating rolling contour trails, which are characterized by gentle grade reversals, out-sloped tread, avoiding the fall-line and avoiding flat "seats," where trails would become puddles. These trail building principles minimize erosion, provide an interesting and unique visitor experience and require little maintenance. In order to meet the fundamental elements and trail building principles described above, some flexibility in layout would be allowed, but the trail would stay within 50 feet to either side of this document's mapped course. Before construction, trail layout would be marked with pin flags. The layout would be inspected by Forest Service employees for compliance with this EIS. Trails would be built both by hand and by a trail dozer, which is a narrow tilt-blade skid steer. Trails would be constructed with a 3 foot wide base. After construction, vegetation would be allowed to grow back in along the edges. The trails would be maintained at a width of 18 inches. At fence crossings, either gates or bicycle cattle guards would be used. Where gates are used, signage would be put up to instruct trail users to close the gate behind them. Signs would be put up for trail users at all road crossings to let them know they are about to cross a road. On the primary roads, which receive the heaviest vehicle traffic volume, signs would be put up for drivers alerting them to look for bikers and/or hikers crossing the road. At water crossings, log stringer trail bridges would be built by laying hewn log stringers over sills. For smaller crossings, single log stringers would be used. For larger water crossings, double log stringers with deck planks would be used. Trail crossings in Mid-Columbia River steelhead critical habitat would follow the PDCs described in Appendix C – Project Design Criteria.

Trail construction, maintenance, funding, and organization of such activities would be done primarily by the local Central Oregon Trail Alliance (COTA), Grant County Chapter through a formal agreement. All the proposed trails would be designed as bicycle/hiker or hiker only. As such, motorized access would be prohibited. Engineering controls and education would be used foremost to prevent OHVs from accessing these trails; different uses (e.g., hiking, biking, OHV use) require different trail design and OHV use of a trail designed for hiking/biking would cause resource damage. Signage would be placed at trailheads to indicate the allowed modes of travel on the trails. Trail design techniques such as routing trails between large trees or logs, and using bicycle width cattle guards at fence crossings would be used to discourage OHV use of the trails. The trails would not be designed for equestrian use, but would not disallow it except for on the hiker only trails. Multiple use trail etiquette information would be provided at trailheads. Motorized access would continue to be allowed on the existing general purpose Nipple Butte trail.

The **Lake Butte trail** (#B-5037) would be extended 1.4 miles, and 3.2 miles of trail would be un-designated. The un-designated mileage would be the portion of trail that goes over Forest Service road (FSR) 1800-243 north of FSR 1800-362, traverses County Road 18, and goes over FSR 1800-279. The route would then start at FSR 3618-243, and instead follow up FSR 3618-362 to its end, and follow a newly constructed trail for 1.4 miles up to Lake Butte where it will tie in with the eastern end of the Jugow trail. The total length of the Lake Butte trail when finished would be 3.5 miles.

Behind **Magone trail** (closed FSR 3618-245). The existing access point on FSR 3618 would be decommissioned (along with 0.7 miles of currently designated trail) to utilize the existing parking area for the Lake Butte trail (#B-5037) on the north side of FSR 3620 at the existing dispersed campsite. In addition, 0.6 miles of new trail construction would occur to connect the Behind Magone trail to the Lake Butte trail (FSR 3618 would need to be crossed). This would create superior loop opportunities, as well as providing for superior scenery and destinations, including views of Magone Lake from a ridge top. It would also serve a need in tying the trails together for creating a destination trail system. The Behind Magone trail would also be linked to the Magone Lake trail through 0.9 miles of new trail construction. The Magone Lake trail would be extended to the southeast from the northeast most point of the trail, as well as two locations on the south end, to link to the Behind Magone trail. This would create a loop back to the boat ramp area. The total length of the Behind Magone trail would be 3.0 miles. A portion of the Magone Lake trail (from the boat ramp to the connection point near the outflow bridge) would be designated as bicycle trail (and improved for such use) in order to provide a loop connection opportunity for bicyclists using the Behind Magone trail. Signage will be placed just passed the junction to inform the public to not ride on the Magone Lake trail, (the trail around the lake).

The **Behind Magone loop** would be a new 1.0 mile loop on closed FSR 3618-299 and FSR 3618-297, which would be connected with 0.3 miles of new construction, creating a loop opportunity off of the Behind Magone trail for families camping at Magone Lake Campground and other visitors.

The **Magone Slide trail** (hiking only) is an existing trail that would extend to the north, looping around the top of the slide and back down to the beginning. This trail extension would create a longer hiking opportunity for campers and other Magone visitors, would provide for loop opportunities, and would traverse the overlook area with views over the slide, as well as views to Magone Lake, the Vinegar Hill-Indian Rock Scenic Area, the Strawberry Mountain Range, and the Aldrich Mountains. This trail extension (1.4 miles) would have an interpretive sign describing the history of the slide and a primitive bench placed at the top of the slide overlook, vastly improving the destination qualities of this hike.

The **Magone Scout trail** is a 13.5 mile new trail proposal that starts at the Nipple Butte trailhead at the west end of trail #346 and ends at the new proposed Lake Butte trail where it crosses FSR 1800-760. The Magone Scout trail would involve both new construction (9.5 miles in IRA, 0.7 miles not in IRA) and old roads (1.0 miles in IRA, 2.3 miles not in IRA). The flow of the trail is as follows. From the west Nipple Butte trailhead, the trail runs south along the ridges on the east side of Nipple Creek, and eventually crosses McClellan Creek just south of its confluence with Nipple Creek. It then follows south along the ridge tops on the east side of McClellan Creek and connects into FSR 3618-083, follows FSR 3618-083 north to FSR 3618-295, follows north along FSR 3618-295 and then follows a stretch of new construction trail up to FSR 3618-125. It then follows FSR 3618-125 to its beginning at FSR 3618-064. It follows FSR 3618-064 north to its junction with 3618-194. Then it heads east and roughly follows along the south side of a fence line until it connects with the end of FSR 1800-760. It then follows along FSR 1800-760 and ends where Lake Butte bike trail crosses it. This trail will skirt along the east end of the wildlife emphasis area.

The **Jugow trail** is a 6.0 mile new construction trail that creates an alternate route from the Nipple Butte trailhead to the Lake Butte trailhead. Unlike the existing Nipple Butte trail, which is more suited for OHVs, much too steep for bikes, and also connects the two trailheads, the Jugow trail would use natural contours as a guide for laying out the trail.

This bike friendly trail would swing out wider to both the north and south than the Nipple Butte trail in order to avoid extended steep inclines. The grades would be short enough in distance to enhance the user experience, rather than hinder it, create a safer trail for bicycles, and would incorporate single-track characteristics such as short grades, turns and grade reversals. Starting at the Nipple Butte (west) trailhead, the Jugow trail would run south of the Nipple Butte trail until about the 1.6 mile mark, where it would cross the fence and the Nipple Butte trail. It would then continue north and traverse above the Jugow Creek headwaters before turning south again. There would be one more swing out to the north before turning south again and working along the north side of the Nipple Butte trail to the Jugow trail's end where it joins the Nipple Butte trail just west of the Lake Butte (east) trailhead.

The **Wade trail** creates loop options by linking the Magone Scout trail, just west of McClellan Creek, to itself at the FSR 3618-125 portion of the Magone Scout trail. The Wade trail would be 3.4 miles in total length (1.2 miles in IRA, 2.2 miles not in IRA).

The **Four Corners trail** connects to Round Top trail at Four Corners, and goes to the east boundary of the Magone project planning area. Its purpose is to connect the Magone trail system to the proposed Four Corners trailhead along FSR 1800-805, and to trails within the Camp Lick project planning area. The Four Corners trail is 0.5 miles within the Magone Project.

The **Camp Lick Connector trail** connects to Lake Butte trail just south of the Lake Butte trailhead, and goes to the northeast boundary of the Magone Project. Its purpose is to connect the Magone trail system to trails within the Camp Lick project planning area. It is 0.4 miles within the Magone Project.

For the **Low Slope trail**, 0.4 miles of FSR 3620-629 would be designated as a bicycle trail. It would provide excellent scenery and, along with the northern part of Round Top trail, create a loop opportunity for the Lake Butte route.

The **North Magone Connector trail** is a 0.1 mile trail that connects the Behind Magone trail to the Magone Lake trail at the northeast corner of the lake. It will provide an opportunity for an expanded hiking loop.

The **Round Top trail** is a 19.1 mile (18.4 miles new construction, 0.7 miles of trail on road) trail that loops around the east portion of the Magone project planning area. It starts at Lake Butte trail and follows FSR 1800-311and FSR 3620-646 to FSR 3620, then crosses FSR 3620 and Tinker Creek. The trail then winds its way south until it crosses FSR 3600-663. It then works its way east until it crosses FSR 36 at Four Corners. It then works its way south, crossing FSR 3600-237 and continuing south until it skirts around the end of FSR 3600-390 and starts heading back to the west. The trail crosses FSR 3600-305 just north of its junction with FSR 3600-723. From there, the trail continues west and winds its way down and across East Fork Beech Creek and FSR 36. It heads back up the slope on the east side of the creek and road, then turns north until it joins the Magone Scout trail at FSR 3618-083.

See Table 4 for a list of the trails proposed under alternative 2 and Map 10.

**Table 4. Alternative 2 proposed hiking and/or bicycle trails**

| Trail | Total length (miles) | Miles of new trail construction | Miles of trail on existing road | Trail designation |
|---|---|---|---|---|
| Behind Magone Loop | 1.0 | 0.3 | 0.7 | Bicycle, foot |
| Behind Magone trail | 3.0 | 1.5 | 1.5 | Bicycle, foot |
| Camp Lick Connector | 0.4 | 0.4 | 0 | Bicycle, foot |
| Four Corners trail | 0.5 | 0.5 | 0 | Bicycle, foot |
| Jugow trail | 6.0 | 6.0 | 0 | Bicycle, foot |
| Lake Butte trail | 3.5 | 1.4 | 2.1 | Bicycle, foot |
| Low Slope trail | 0.4 | 0 | 0.4 | Bicycle, foot |
| Magone Scout Trail | 13.5 | 10.2 | 3.3 | Bicycle, foot |
| Magone Slide trail | 1.4 | 1.4 | 0 | Foot |
| North Magone Connector trail | 0.1 | 0.1 | 0 | Foot |
| Round Top trail | 19.1 | 18.4 | 0.7 | Bicycle, foot |
| Tinker Creek trail | 1.7 | 0 | 1.7 | Bicycle, foot |
| Wade trail | 3.4 | 3.4 | 0 | Bicycle, foot |
| **Total** | **54.0** | **43.6** | **10.4** | |

Several trails in the Magone project planning area would be un-designated (Table 5).

**Table 5. Alternative 2 existing trails to un-designate**

| Trail | Total length (miles) |
|---|---|
| Trail on FSR 3618-245 | 0.7 |
| Trail on FSR 1800-243, County Road 18, and FSR 1800-279 | 3.2 |
| **Total** | **3.9** |

The purpose of un-designating the above listed trails on roads is, in both cases, to re-route the trails off of roads where the trail shares use with vehicular traffic. The two reasons this is needed are to improve safety and to enhance the recreational experience.

The Behind Magone trail follows FSR 3618-245. Currently, there is no developed trailhead for the trail. The start of the trail is on a tight turn of FSR 3618 where it junctions with FSR 3618-245. Passing motorists only see a gated road with a “closed” sign. There is parking space for one vehicle in front of the gate. However, travel to the start of the trail by anything other than automobile requires traversing FSR 3618, which is the paved primary access road to the Magone Lake Recreation Area. It can be quite busy with vehicular traffic, especially during high use periods, creating a safety issue for those wanting to approach the start of the Behind Magone trail by anything other than automobile. The solution is to move the start of the trail and build new trail that ties in with the road portion about 0.7 miles in. The first 0.7 miles of FSR 3618-245 that are currently part of the Behind Magone trail would no longer be needed, and would thus be un-designated. The new start location would be directly across FSR 3618 from the Tinker Creek trailhead, which is the start of the Lake Butte trail. This would allow ample parking for those wanting to use the Behind Magone trail, with the need to only cross FSR 3618, rather than traveling on it. For those coming from the campground, the distance of travel needed on FSR 3618 would be greatly reduced. Moreover, it would eliminate the need to be on the curvy stretch of the road where blind corners create a safety issue.

As with the Behind Magone trail, the Lake Butte trail goes over roads. FSR 1800-243, the first portion of Lake Butte trail is a closed road that is suitable as a trail. However, with a portion of the Lake Butte trail traversing County Road 18, the same safety issue of mixing recreational use with vehicular traffic exists here as it does with access to the Behind Magone trail. In addition, stringing together segments of roads that include primary vehicular roads does not provide a desirable recreational experience. This problem can be solved by moving the Lake Butte trail over an alternate closed road, and constructing a new trail segment that would connect to Lake Butte and the Lake Butte trailhead. As a part of that change, some of the road segments that currently comprise the Lake Butte trail would not be needed, and would thus be un-designated. These segments include the portion of FSR 1800-243 north of its junction with FSR 3618-362, a segment of County Road 18, and FSR 1800-279.

**Accessible Trail Development**

The portion of trail from the inlet bridge at Lake Creek to the northeast end would be designed to meet accessibility standards. The surface would be changed from dirt to bituminous surface with a wider width meeting accessibility standards. A picnic table would be placed adjacent to the trail and an interpretive sign would be installed.

**Trailhead Developments**

**Nipple Butte Trailhead**: For the Nipple Butte trail (#346) on the west end, road access needs to have the ruts removed and the roadbed leveled out and gravel placed. Directional signage to the trailhead would be installed on FSR 3947. At the trailhead, the parking area needs to be more defined with boulders, and the parking lot graveled. A sign would be installed at the trailhead. The trailhead on the east end needs better directional signage on County Road 18 and on FSR 1800-279.

**Lake Butte trailhead**: The trailhead for B-5037 Lake Butte trail needs better directional signage placed on FSR 3618 and at the trailhead. The existing dispersed campsite would be converted to parking for B-5037 Lake Butte trail.

**Four Corners trailhead**: The trailhead would be at the beginning of FSR 1800-805 (a closed road), creating a parking area for 4 vehicles. The road would have boulders placed to keep traffic off the closed portion of the road. Trailhead signs would be installed at the trailhead.

### *Interpretive Signs*

This proposal includes placing interpretive signs that convey the natural history of Magone Lake, along with information about fire ecology, heritage, grazing, vegetation, and wildlife to integrate these many aspects of the project planning area together for forest visitors. The interpretation sites would be located at Four Corners and within the Magone Lake recreation area. The site at Four Corners would have a sign with interpretive panels, while the Magone Lake Recreation Area signs would be located at the new Slide trail overlook, along the Magone Lake trail where the slide is visible and along the trail at the northeast corner of the lake.

- Along Slide Trail: the sign content will be about the slide that created Magone Lake.
- East side of Magone Lake (at the location where the landslide is in view): the sign content will be about the slide that created Magone Lake.
- Four Corners: the sign content will be about the role of fire, the area's cultural heritage, the importance of the area to grazing, and the vegetation types in the area.
- North side of Magone Lake: the sign content will be about the beaver activity that occurs around the lake.

### *Docks and Boat Moorings*

**Day Use Boat Dock**

The existing floating boat dock would be improved by adding a boardwalk on the west side of the existing floating dock that will be anchored on both ends allowing for high water movement for more easily boat launching. The aluminum railing would either be replaced or made more rustic in design to fit the natural landscape in color and texture of material.

**Campground Boat Mooring**

Replace existing boat mooring with a new boat mooring that would accommodate 2 to 3 boats. The new boat mooring would be located approximately 100 to 200 feet south west of the existing boat mooring location. This would get the new mooring into deeper water for boats. The purpose of this dock would be to allow campers to dock their boats overnight or while not in use and avoid having to pull the boat onto shore causing shoreline damage. This new dock would also provide campers with an alternative to repeatedly loading and unloading their watercraft from the boat launch (limiting congestion at boat launch).

**Fishing Dock**

Place a new floating fishing dock on the east side of Magone Lake in conjunction with the addition of fish cribs and fish sticks (see description below under Magone Lake Restoration Activities). Dock would specifically target access for shoreline fishermen to fish cribs and fish sticks. Dock would be assembled at boat launch and towed to location in the spring and removed each fall.

### 2.2.2.6 Magone Lake Restoration Activities

Fish cribs and fish sticks would be placed in Magone Lake to increase near shore habitat complexity for fish, provide cover/habitat for bait fish and aquatic insects, provide cover for beaver which currently are present on the lake, and provide nesting sites for waterfowl. These structures would also increase shoreline fishing opportunities.

- **Fish Cribs (15–20 placed throughout Magone Lake)** – Fish cribs would be built on the ice during winter by volunteers, partners, contractors, and Forest Service personnel. The cribs would have a minimum of 5 feet of water over the top of them (which would avoid creating navigational hazards for boaters). All material with the exception of rock ballasts and fasteners would be biodegradable. The dimensions of the fish cribs would be approximately 8 feet long by 8 feet wide. Branches and limbs from thinning would not be piled onsite for burning but used to fill the interior of the cribs, with rock ballasts piled on top.
- **Fish Sticks (70–100 in singles and clusters of 5–7 trees placed throughout Magone Lake)** – 5 to 7 trees (mostly 8–12 inches DBH) with 50 foot distance between groups. Groups would be cabled together with ¼ inch cable.
- **Fish Sticks Option 2 Design**: to avoid using cable 3 to 5 trees with rootwads attached would be placed on top of the ice using equipment. Trees would be pushed onto the ice, not carried whole (equipment would stay off of ice). Rootwads function as anchors keeping the group of trees in place. The group would be capped with a larger tree placed on top parallel to the shoreline. Limbs would be placed to interlock with each bole.

### 2.2.2.7 Proposed Forest Plan Amendments

Alternative 2 includes the following forest plan amendments. These amendments would apply only for the duration of, and those actions proposed in, the site-specific Magone Project.

#### *Changes to Old Growth Boundaries*

Dedicated old growth habitats (DOGs), replacement old growth habitats (ROGs) and pileated woodpecker feeding areas (PWFAs) are identified based on a set of criteria. The DOG is the system of dedicated old growth units set aside by the Malheur Forest Plan. Individual DOG units are classified by the management indicator species dependent on the habitat's unique characteristics. For DOGs associated with pileated woodpeckers, a PWFA is required. ROGs are established by the Malheur Forest Plan to counter possible large-scale damage or deterioration of DOGs. Replacement areas may not currently have all characteristics of old growth, but are managed to achieve those characteristics in the future so that when a DOG no longer meets the needed habitat requirements, the ROG can take its place.

Within the project planning area, the number of acres set aside for ROGs and PWFAs is currently below thresholds in the Malheur Forest Plan. The proposed forest plan amendment would redraw Management Area (MA) 13 boundaries for existing areas to ensure the best possible Old Growth stands are incorporated and delineate boundaries for new areas within the project planning area to bring total acres up to Malheur Forest Plan standards. There would be a net gain of ROG and PWFA acreages. Alternative 2 would result in changes and additions to DOGs and ROGs/feeding areas to meet MA-13 standards.

This forest plan amendment would expand the MA-13 network, as well as adding additional acreage to more closely attain 900-acre home ranges recommended by Bull and Holthousen (1993) for pileated woodpeckers in those DOGs designated for pileated woodpeckers. An additional 1,000+ acres would be officially added to the MA-13 network.

Table 6 compares the existing old growth habitats set aside within the project planning area with the proposed changes in relation to Malheur Forest Plan standards. See Appendix B, Maps 2 and 13.

**Table 6. Summary of existing old growth habitat and proposed changes within the project planning area for pileated woodpecker and pine marten**

| | DOGs | | ROGs | | PWFAs | |
|---|---|---|---|---|---|---|
| | **Areas** | **Acres** | **Areas** | **Acres** | **Areas** | **Acres** |
| Existing habitat | 8 | 1,788 | 0 | 0 | 0 | 0 |
| Proposed new areas | 0 | 0 | 5 | +1,372 | 3 | +1,089 |
| Proposed changes to existing areas | 3 | -312 | 0 | 0 | 0 | 0 |
| ***Habitat after proposed changes*** | ***8*** | ***1,476*** | ***5*** | ***1,372*** | ***3*** | ***1,089**** |

*Pileated woodpecker feeding areas (PWFA) are not added into the total estimated acreages because all additional acres were designated as ROG and assumes to include PWFAs.

DOGs would decrease by approximately 312 acres, ROGs would increase by 1,372 acres, and PWFAs would increase by 1,089 acres. The decrease in DOG acres would be from reallocating some DOG acres to ROGs.

*Reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) Cover below Malheur Forest Plan Standards*

An amendment is proposed to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover below the Malheur Forest Plan standard of 12 percent in the Grub Creek subwatershed. Alternative 2 would reduce satisfactory cover from the existing 31.8 to 10.1 percent.

An amendment is proposed to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) to reduce winter range satisfactory cover below the Malheur Forest Plan standard of 10 percent in the Grub Creek subwatershed. Alternative 2 would reduce satisfactory cover from the existing 29.5 to 5.9 percent.

An amendment is proposed to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) to reduce satisfactory cover below the Malheur Forest Plan standard of 20 percent and total cover below the standard of 40 percent in the Nipple Butte Wildlife Emphasis Area. Alternative 2 would reduce satisfactory cover from the existing 46.8 to 16.5 percent and total cover from the existing 70.6 to 39.5 percent.

This amendment would apply only for the duration of, and those actions proposed in, the site-specific Magone Project.

## 2.2.3 Alternative 3

Alternative 3 was developed to meet the purpose and need for the Magone Project, while addressing the issues identified in Chapter 1 by generally responding to comments requesting more activities. This alternative was developed in response to comments received:

- Requesting more silviculture treatments, including in the Nipple Butte IRA.
- That expressed concern about spring burning in the Nipple Butte IRA, and how it could impact forage production on the range allotment located within the IRA.
- Requesting that certain road segments be left as Maintenance level 2 (open) for access for hunting and dispersed campsites.
- Requesting more and different hiking/bicycle trails.

### 2.2.3.1 Silviculture Treatments

*This alternative has the following changes from alternative 2, with a total increase of 1,506 acres treated:*

- *2,611 acres more commercial and non-commercial thinning*
- *27 acres less commercial and non-commercial thinning, leave stand denser*
- *86 acres less post and pole removal*
- *242 acres less non-commercial thinning*
- *769 acres less non-commercial thinning, with designation of Replacement Old Growth*

The description of silvicultural treatments for commercial and non-commercial thinning, commercial and non-commercial thinning (leave stand denser), commercial and non-commercial thinning (with re-designation from DOG to ROG), post and pole removal, non-commercial thinning, non-commercial thinning (with designation of ROG), conifer reduction in aspen stands, and biomass removal under alternative 2 are the same for alternative 3.

The following silviculture treatments would be implemented under alternative 3:

- Commercial and non-commercial thinning (5,918 acres, 142 units)
- Commercial and non-commercial thinning, leave stand denser (751 acres, 14 units)
- Commercial and non-commercial thinning, with re-designation from DOG to ROG (223 acres, 4 units)
- Post and pole removal (292 acres, 4 units)
- Non-commercial thinning (5,906 acres, 173 units)
- Non-commercial thinning, with designation as ROG (270 acres, 4 units)
- Conifer reduction in aspen stands (18 acres, 7 units)
- Biomass removal (up to 10,458 acres)
- Harvest Systems/Activity Fuels Treatments: The areas proposed for commercial thinning (7,184 acres, 164 units) would be yarded via tractor, skyline, or a combination as follows:
    - Tractor – 5,650 acres, 132 units
    - Skyline – 305 acres, 8 units
    - Tractor and skyline – 1,229 acres, 24 units
- Harvest systems and associated fuel treatments would occur as follows:
    - Whole tree yarding and/or cut to length, grapple piling and/or hand piling, and pile burning – 7,184 acres, 164 units
    - Grapple piling and/or hand piling with pile burning – 3,230 acres, 103 units
    - Hand piling and pile burning only – 2,964 acres, 81 units

See Appendix B – Maps, Map 4.

#### 2.2.3.2 Prescribed Burning and Unplanned Ignitions

*This alternative has the following changes from alternative 2:*

- *Prescribed burning within most of the Nipple Butte IRA was changed to fall only ignition.*

Prescribed fire would be used in both mechanically treated and untreated stands as fire is re-introduced into the project planning area. Treated stands would see a combination of burning piled material and underburning. Those stands not being mechanically treated would be managed primarily with the use of prescribed burning. As conditions and stand characteristics allow unplanned ignitions within the planning area would be used to meet the objectives of prescribed burning.

- Underburning up to 28,500 acres. This includes approximately 1,400 acres outside of the project planning area boundary. Expanding these prescribed fire boundaries to natural fuel breaks increases firefighter safety and limits resource damage created by constructing new containment lines.
    - Prescribed burning would be conducted primarily in the spring or fall on up to 17,200 acres. However, the effects of climate change could create environmental conditions suitable for prescribed burning during the winter or summer as well. The exception would be burn blocks 6 and 7 where planned ignitions are likely to only occur in the fall on 11,300 acres (Table 7).
    - Up to 9,600 acres of underburning would be within designated wildland-urban interface. This includes 300 acres outside the project planning area boundary.

- Pile burning in silviculture treatments units would include up to approximately 13,400 acres. Acres that would be pile burned are also included in (i.e., overlap with) the total underburning acres.

Table 7 shows the acreages for the burn blocks, see Appendix B – Maps, Map 6 to view location of the various burn blocks in the Magone project planning area.

**Table 7. Alternative 3 prescribed burn blocks**

| Burn block | Acres | Season of planned ignitions* |
|---|---|---|
| Block 1 | 1,400 acres | Winter, spring, summer, or fall |
| Block 2 | 7,400 acres | Winter, spring, summer, or fall |
| Block 3 | 2,700 acres | Winter, spring, summer, or fall |
| Block 4 | 1,000 acres | Winter, spring, summer, or fall |
| Block 5 | 3,600 acres | Winter, spring, summer, or fall |
| Block 6 | 6,300 acres | Fall only |
| Block 7 | 4,900 acres | Fall only |
| Block 8 | 1,200 acres | Winter, spring, summer, or fall |
| **Total** | **28,500 acres** | ***unplanned ignitions can be used any season** |

### 2.2.3.3 Road Activities

*This alternative has the following changes from alternative 2:*

- *Increases temporary road construction by 4.4 miles.*
- *Increases road maintenance for haul by 20.8 miles.*
- *Reduces road closures by 0.8 miles.*
- *Would not close any currently open roads and co-designate the road as a trail and ML 1 road (a reduction of 1.4 miles).*
- *Would not convert any closed roads to trail (a reduction of 1.2 miles)*
- *Would co-designate 5.5 more miles of existing road as trail.*

#### *Road Use, Road Maintenance, and Temporary Road Construction*

The description of road activities for road maintenance for haul, closed roads to be temporarily opened for haul, and temporary road construction under alternative 2 are the same for alternative 3.

- Road maintenance for haul (98.5 miles, 105 road segments)
- Closed roads to be temporarily opened for haul (46.9 miles, 68 road segments) – This mileage is included above under road maintenance.
- Temporary road construction (12.9 miles, 49 segments)

See Appendix B – Maps, Map 4.

#### *Road System Changes*

The description of road activities for road decommissioning, closure of currently open roads (ML 2 to ML 1), and co-designating an existing road as a trail under alternative 2 are the same for alternative 3. No currently open roads would be closed (ML 2 to ML 1) and co-designated as a trail and no roads would be converted to a trail (ML 1 to trail).

- Road decommissioning (0.3 miles, 1 road segment)
- Close currently open roads (ML 2 to ML 1) (0.3 miles, 2 road segments)
- Co-designate existing road as a trail (9.5 miles, 15 road segments)

See Appendix B – Maps, Map 9.

#### 2.2.3.4 Recreation Opportunity Improvements

*This alternative has the following changes from alternative 2:*

- *42.3 more miles of new hiking/bicycle trails, including 41 miles of new trail construction and 1.3 miles of trail designated on existing roads.*
- *Construction of a new trailhead near the junction of FSR 3618-064 and 3618-125.*
- *Addition of OHV use designated on FSR 36 to 4 Corners.*

The description of recreation opportunity improvements for proposed hiking and/or bicycle trails of Behind Magone Loop, Behind Magone trail, Camp Lick Connector trail, Four Corners trail, Jugow trail, Lake Butte trail, Low Slope trail, Magone Scout trail, Magone Slide trail, North Magone Connector trail, Round Top trail, and Wade trail; Nipple Butte trail relocation; existing trails to un-designate; improvement of existing Nipple Butte and Tinker Creek trailheads and construction of new trailhead at 4 Corners; interpretive sign additions; and docks and boat moorings under alternative 2 are the same for alternative 3.

The following recreation opportunity improvements would be implemented under alternative 3.

*Trail Developments*

**Hiking/Bicycle Trails**

The following trails, in addition to those described under alternative 2, would be constructed under alternative 3.

The **Central Connector trail** is a 1.7 mile new construction trail that connects the northern portion of Round Top trail to the East Fork Beech Creek Cut-off trail. This trail provides for a smaller loop opportunity for those traversing the Round Top trail. It crosses open FSR 3600-663, FSR 36 and East Fork Beech Creek.

The **East Fork Beech Creek Cut-off trail** is a 1.4 mile new construction trail that connects the East Fork Beech Creek trail to the Four Corners Connector trail just north of where it junctions with the Round Top trail. It junctions with the Central Connector trail at its northern-most point and crosses open FSR 3600-544.

The **East Fork Beech Creek trail** is a 1.8 mile new construction trail that connects the Tinker Creek trail near its southern-most point to the southern portion of the Round Top trail. It junctions with the west end of East Fork Beech Creek Cut-off trail and crosses open FSR 3600-544, East Fork Beech Creek and FSR 36.

The **East Project trail** is a 7.3 mile new construction trail that begins at the proposed Four Corners trailhead and goes to the southeast on the east side of County Road 18 and along the eastern project boundary, crossing FSR 1800-595 and eventually County Road 18 at the southeast corner of the project planning area. It then crosses FSR 1800-031 and connects to the southeastern-most stretch of the Round Top trail.

The **Forest View trail** is a 1.6 mile trail that is both new construction and on a road. It is a loop off of the Behind Magone trail, intended to create a loop extension, primarily for family recreationists coming over from the campground. It begins on FSR 3618-263 for 0.3 miles near where the proposed new construction segment of the Behind Magone trail connects to the existing trail location. The Forest View trail traverses the slope on the west side of Tinker Creek canyon.

The **Four Corners Connector trail** is a 2.3 mile new construction trail that connects the Round Top trail at Four Corners to the East Fork Beech Creek Cut-off trail just north of where it junctions with the Round Top trail. It runs northeast to southwest.

The **High Ridge trail** is a 3.5 mile new construction trail in the Nipple Butte IRA that connects the Porcupine trail and the Magone Scout trail to create a loop opportunity. It runs east to west.

The **Magone Connector trail** is a 0.2 mile new construction trail that provides a short-cut connection of the Magone Lake trail to the Behind Magone trail. It is intended to provide additional loop opportunities primarily for family users coming over from the campground.

The **Outer Loop trail** is a 1.2 mile new construction trail that would provide another loop opportunity by connecting the Behind Magone Loop trail to the new construction segment of the Behind Magone trail. The Outer Loop trail would allow trail users to go further south on the Behind Magone trail complex without getting too far away from the Magone Lake Recreation area.

The Porcupine trail is a 12.5 mile trail that would be both new construction (11.6 miles) and trail on road (0.9 miles). It starts at the Lake Butte trail at the north end of FSR 1800-760 and goes to the northeast corner of FSR 3618-064, follows the road south for 0.4 miles, then goes west across the northern half of Nipple Butte IRA, generally following the contours and providing outstanding views, and eventually crossing the Magone Scout trail just south of the Nipple Butte trailhead. It then works its way over to the western roadless area boundary and turns south, working its way down the ridge line. It crosses an eastern tributary to Clear Creek before working its way back to the west and tying back in with the Magone Scout trail on the west side of McClellan Creek.

The **Prohibition Loop** is a 1.3 mile road on trail loop off of the Porcupine Trail that traverses FSR 3618-064. It is intended to provide an additional small loop opportunity for hikers and bikers.

The **Shortcut trail** is a 0.4 mile trail that connects the East Fork Beech Creek Cut-off trail to the Tinker Creek Loop and Central Connector trail at a 3-way junction.

The **South View trail** is a 4.0 mile new construction trail that connects the Round Top trail at Four Corners to the East Project trail near its southern-most point. The South View trail runs primarily north-south on the west side of County Road 18. It crosses open FSR 3600-237, and junctions with the east end of the Southeast Connector trail.

The **Southeast Connector trail** is a 0.1 mile new construction trail that provides a shortcut from the South View trail to the East project trail.

The **Tinker Creek Loop** is a 4.0 mile loop off of the Round Top trail that traverses roads as well as new construction. It begins at the Round Top trail about 0.7 miles down the Round Top trail south of FSR 3620, where it meets the end of FSR 3620-714. The trail follows FSR 3620-714 to its junction with FSR 3600-697, which it traverses to the south end of the road. It then continues on in new construction counter-clockwise and loops back to the north and joins FSR 3600-697 again just west of its junction with FSR 3600-663.

See Table 8 for a list of the trails proposed under alternative 3 and see Appendix B – Maps, Map 11 to view location of proposed trails.

**Table 8. Alternative 3 proposed hiking and/or bicycle trails**

| Trail | Total length (miles) | Miles of new trail construction | Miles of trail on existing road | Trail designation |
|---|---|---|---|---|
| Behind Magone Loop | 1.0 | 0.3 | 0.7 | Bicycle, foot |
| Behind Magone trail | 1.5 | 1.5 | 0 | Bicycle, foot |
| Camp Lick Connector | 0.4 | 0.4 | 0 | Bicycle, foot |
| Central Connector Trail | 1.7 | 1.7 | 0 | Bicycle, foot |
| East Fork Beech Creek Cut-off trail | 1.4 | 1.4 | 0 | Bicycle, foot |
| East Fork Beech Creek trail | 1.8 | 1.8 | 0 | Bicycle, foot |
| East Project trail | 7.3 | 7.3 | 0 | Bicycle, foot |
| Forest View trail | 1.6 | 1.3 | 0.3 | Bicycle, foot |
| Four Corners trail | 0.5 | 0.5 | 0 | Bicycle, foot |
| Four Corners Connector trail | 2.3 | 2.3 | 0 | Bicycle, foot |
| High Ridge trail | 3.5 | 3.5 | 0 | Bicycle, foot |
| Jugow trail | 6.0 | 6.0 | 0 | Bicycle, foot |
| Lake Butte trail | 3.5 | 1.4 | 2.1 | Bicycle, foot |
| Low Slope trail | 0.4 | 0 | 0.4 | Bicycle, foot |
| Magone Connector trail | 0.2 | 0.2 | 0 | Bicycle, foot |
| Magone Scout Trail | 13.5 | 10.2 | 3.3 | Bicycle, foot |
| Magone Slide trail | 1.4 | 1.4 | 0 | Foot |
| North Magone Connector trail | 0.1 | 0.1 | 0 | Foot |
| Outer Loop trail | 1.2 | 1.2 | 0 | Bicycle, foot |
| Porcupine trail | 12.5 | 11.6 | 0.9 | Bicycle, foot |
| Prohibition Loop | 1.3 | 0 | 1.3 | Bicycle, foot |
| Round Top trail | 19.1 | 19.1 | 0 | Bicycle, foot |
| Shortcut trail | 0.4 | 0.4 | 0 | Bicycle, foot |
| South View trail | 4.0 | 4.0 | 0 | Bicycle, foot |
| Southeast Connector trail | 0.1 | 0.1 | 0 | Bicycle, foot |
| Tinker Creek trail | 2.2 | 0.5 | 1.7 | Bicycle, foot |
| Tinker Creek Loop | 4.0 | 3.0 | 1.0 | Bicycle, foot |
| Wade trail | 3.4 | 3.4 | 0 | Bicycle, foot |
| **Total** | **96.3** | **84.6** | **11.7** | |

**Accessible Trail Development**

The accessible trail development would be the same as described under alternative 2.

**Trailhead Developments**

The existing Nipple Butte and Lake Butte trailheads would be improved and the new trailhead at Four Corners would be developed as described under alternative 2.

Trailhead near junction of FSR 3618-064 and 3618-125 (Tinker Creek Trailhead): The site is an existing dispersed camping area that would be used as the parking area for 4 vehicles. This site would be rustic in nature with a trailhead sign, some leveling and gravel placement. Boulders if needed would be placed to delineate the parking area.

*Interpretive Signs*

The interpretive sign additions would be the same as described under alternative 2.

*Docks and Boat Moorings*

The day use boat dock, campground boat mooring, and fishing dock would be the same as described under alternative 2.

*Off-Highway Vehicle (OHV) Use*

OHV use would be designated on FSR 36 from Four Corners to where FSR 36 turns into County Road 32. This would be a legal change and signs would be placed along the route indicating that it is open for OHV use.

### 2.2.3.5 Magone Lake Restoration Activities

*The description of Magone Lake restoration activities including the number of fish cribs and fish sticks placed under alternative 2 is the same for alternative 3.*

### 2.2.3.6 Proposed Forest Plan Amendments

Alternative 3 includes the following forest plan amendments. These amendments would apply only for the duration of, and those actions proposed in, the site-specific Magone Project.

*Changes to Old Growth Boundaries*

The description of changes to old growth boundaries described under alternative 2 is the same for alternative 3.

*Reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) Cover below Malheur Forest Plan Standards*

An amendment is proposed to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover below the Malheur Forest Plan standard of 12 percent in the Grub Creek subwatershed. Alternative 3 would reduce satisfactory cover from the existing 31.8 to 8.2 percent.

An amendment is proposed to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) to reduce winter range satisfactory cover below the Malheur Forest Plan standard of 10 percent and total cover below the standard of 25 percent in the Grub Creek subwatershed. Alternative 3 would reduce satisfactory cover from the existing 29.5 to 3.3 percent and total cover from the existing 87.4 to 17.1 percent in the Grub Creek subwatershed.

An amendment is proposed to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) to reduce satisfactory cover below the Malheur Forest Plan standard of 20 percent and total cover below the standard of 40 percent in the Nipple Butte WEA. Alternative 3 would reduce satisfactory cover from the existing 46.8 to 16.6 percent and total cover from the existing 70.6 to 39.3 percent.

This amendment would apply only for the duration of, and for those actions proposed in, the site-specific Magone Project.

## 2.2.4 Alternative 4

Alternative 4 was developed to meet the purpose and need for the Magone Project, although to a lesser extent than alternative 2, while addressing the issues identified in Chapter 1 by generally responding to comments requesting less activities.

- This alternative is in response to comments received requesting fewer silviculture treatments, including in the Nipple Butte IRA.
- This alternative is in response to comments received expressing concern about prescribed burning occurring in the Nipple Butte IRA.
- This alternative is in response to comments received requesting that certain road segments be left as Maintenance level 2 (open) for access for hunting and dispersed campsites.
- This alternative is in response to comments raised with concerns regarding the amount of fish cribs and fish sticks that would be placed into Magone Lake.

### 2.2.4.1 Silviculture Treatments

*This alternative has the following changes from alternative 2, with a total reduction of 6,367 acres treated:*

- *382 acres less commercial and non-commercial thinning*
- *384 acres less commercial and non-commercial thinning, leave stand denser*
- *No commercial and non-commercial thinning, with re-designation from DOG to ROG*
- *127 acres less post and pole removal*
- *4,231 acres less non-commercial thinning*
- *No non-commercial thinning, with designation of ROG*

The description of silvicultural treatments for commercial and non-commercial thinning, commercial and non-commercial thinning (leave stand denser), post and pole removal, non-commercial thinning, conifer reduction in aspen stands, and biomass removal under alternative 2 are the same for alternative 4. No commercial and non-commercial thinning (with re-designation from DOG to ROG) or non-commercial thinning (with designation of ROG) would occur under this alternative.

The following silviculture treatments would be implemented under alternative 4:

- Commercial and non-commercial thinning (2,925 acres, 79 units)
- Commercial and non-commercial thinning, leave stand denser (394 acres, 8 units)
- Post and pole removal (251 acres, 5 units)
- Non-commercial thinning (1,917 acres, 53 units)
- Conifer reduction in aspen stands (18 acres, 7 units)
- Biomass removal (up to 5,505 acres)

- Harvest Systems/Activity Fuels Treatments: The areas proposed for commercial thinning (3,570 acres) would be yarded via tractor, skyline, or a combination as follows:
    - Tractor – 2,955 acres, 76 units
    - Skyline – 243 acres, 7 units
    - Tractor and skyline – 372 acres, 9 units
- Harvest systems and associated fuel treatments would occur as follows:
    - Whole tree yarding and/or cut to length, grapple piling and/or hand piling, and pile burning – 3,570 acres, 92 units
    - Grapple piling and/or hand piling with pile burning – 1,917 acres, 54 units
    - Hand piling and pile burning only – 18 acres, 7 units

See Appendix B – Maps, Map 5.

#### 2.2.4.2 Prescribed Burning and Unplanned Ignitions

*This alternative has the following changes from alternative 2:*

- *Prescribed burning in the Nipple Butte IRA (11,300 acres) using planned ignitions was dropped under this alternative.*

Both mechanically treated and untreated stands would be exposed to prescribed burning as fire is re-introduced into the project planning area. Treated stands would see a combination of burning piled material and underburning. Those stands not being mechanically treated would be managed exclusively with the use of prescribed burning. As conditions and stand characteristics allow, unplanned ignitions would be used within the planning area to meet the objectives of prescribed burning.

- Underburning up to 17,200 acres. This includes approximately 1,400 acres outside of the project planning area boundary. Expanding these prescribed fire boundaries to natural fuel breaks increases firefighter safety and limits resource damage created by constructing new containment lines.
    - Up to 9,600 acres of underburning would be within designated wildland-urban interface. This includes 300 acres outside the project planning area boundary.
- Pile burning in silviculture treatments units would include up to approximately 5,600 acres. Acres that are pile burned are also included in (i.e., overlap with) the total underburning acres.

Table 9 shows the acreages for the burn blocks. See Appendix B – Maps, Map 7 to view location of the various burn blocks in the Magone project planning area.

**Table 9. Alternative 4 prescribed burn blocks**

| Burn block | Acres | Season of planned ignitions* |
|---|---|---|
| Block 1 | 1,400 acres | Winter, spring, summer, or fall |
| Block 2 | 7,400 acres | Winter, spring, summer, or fall |
| Block 3 | 2,700 acres | Winter, spring, summer, or fall |
| Block 4 | 1,000 acres | Winter, spring, summer, or fall |
| Block 5 | 3,600 acres | Winter, spring, summer, or fall |
| Block 8 | 1,200 acres | Winter, spring, summer, or fall |
| **Total** | **17,300 acres** | ***unplanned ignitions can be used any season** |

### 2.2.4.3 Road Activities

*This alternative has the following changes from alternative 2:*

- *Decreases temporary road construction by 0.4 miles.*
- *Decreases road maintenance for haul by 0.5 miles.*
- *Reduces road closures by 0.8 miles.*
- *Would not close any currently open roads and co-designate the road as a trail and ML 1 road (a reduction of 2.6 miles).*
- *Would not convert any closed roads to trail (a reduction of 1.2 miles)*
- *Would co-designate 2.7 miles less of existing road as trail.*

#### *Road Use, Road Maintenance, and Temporary Road Construction*

The description of road activities for road maintenance for haul, closed roads to be temporarily opened for haul, and temporary road construction under alternative 2 are the same for alternative 4.

- Road maintenance for haul (77.2 miles, 77 road segments)
- Closed roads to be temporarily opened for haul (28.5 miles, 45 road segments) – This mileage is included above under road maintenance.
- Temporary road construction (8.1 miles, 28 road segments)

See Appendix B – Maps, Map 5.

#### *Road System Changes*

The description of road activities for road decommissioning, closure of currently open roads (ML 2 to ML 1), and co-designating an existing road as a trail under alternative 2 are the same for alternative 4. No currently open roads would be closed (ML 2 to ML 1) and co-designated as a trail and no roads would be converted to a trail (ML 1 to trail).

- Road decommissioning (0.3 miles, 1 road segment)
- Close currently open roads (ML 2 to ML 1) (0.3 miles, 2 road segments)
- Co-designate existing road as a trail (1.3 miles, 3 road segments)

See Appendix B – Maps, Map 10.

### 2.2.4.4 Recreation Opportunity Improvements

*This alternative has the following changes from alternative 2:*

- *38.6 less miles of new hiking/bicycle trails, including 32.5 miles of new trail construction and 6.1 miles of trail designated on existing roads.*
- *No new construction of a trailhead at 4 Corners.*
- *No new interpretive sign additions.*
- *No new fishing dock on the east side of the lake.*

The description of recreation opportunity improvements for proposed hiking and/or bicycle trails of Behind Magone Loop, Behind Magone trail, Camp Lick Connector trail, Jugow trail, Lake Butte trail, Magone Slide trail, and North Magone Connector trail; Nipple Butte trail relocation; existing trails to un-designate; and improvement of existing Nipple Butte and Tinker Creek trailheads; and day use boat dock and campground boat mooring under alternative 2 are the same for alternative 4.

The following recreation opportunity improvements would be implemented under alternative 4.

### *Trail Developments*

**Hiking/Bicycle Trails**

See Table 10 for a list of the trails proposed under alternative 4 and see Appendix B – Maps, Map 12 to view the location of proposed trails.

**Table 10. Alternative 4 proposed hiking and/or bicycle trails**

| Trail | Total length (miles) | Miles of new trail construction | Miles of trail on existing road | Trail designation |
|---|---|---|---|---|
| Behind Magone Loop | 1.0 | 0.3 | 0.7 | Bicycle, foot |
| Behind Magone trail | 3.0 | 1.5 | 1.5 | Bicycle, foot |
| Camp Lick Connector | 0.4 | 0.4 | 0 | Bicycle, foot |
| Jugow trail | 6.0 | 6.0 | 0 | Bicycle, foot |
| Lake Butte trail | 3.5 | 1.4 | 2.1 | Bicycle, foot |
| Magone Slide trail | 1.4 | 1.4 | 0 | Foot |
| North Magone Connector trail | 0.1 | 0.1 | 0 | Foot |
| **Total** | **15.4** | **11.1** | **4.3** | |

**Trailhead Developments**

The improvement of the existing Nipple Butte and Lake Butte trailheads would be the same as described under alternative 2.

### *Docks and Boat Moorings*

The day use boat dock and campground boat mooring would be the same as described under alternative 2. A fishing dock on the east side of Magone Lake is not proposed within this alternative.

## 2.2.4.5 Magone Lake Restoration Activities

*This alternative reduces the number of fish cribs placed by 10, and the number of fish sticks by 30.*

The description of Magone Lake restoration activities for fish cribs and fish sticks under alternative 2 is the same for alternative 4.

- Fish Cribs (5–10 placed throughout Magone Lake)
- Fish Sticks (40–70 in singles and clusters of 5–7 trees placed throughout Magone Lake)

## 2.2.4.6 Proposed Forest Plan Amendments

Alternative 4 includes the following forest plan amendments. These amendments would apply only for the duration of, and for those actions proposed in, the site-specific Magone Project.

### *Changes to Old Growth Boundaries*

The description of changes to old growth boundaries described under alternative 2 is the same for alternative 4.

*Reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) Cover below Malheur Forest Plan Standards*

No amendment to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) is proposed under alternative 4.

No amendment to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) is proposed under alternative 4.

No amendment to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) is proposed under alternative 4.

## 2.2.5 Mitigation Common to All Action Alternatives

The Forest Service also developed the project design criteria to be used as part of all of the action alternatives (see Appendix C – Project Design Criteria).

## 2.2.6 Monitoring Common to All Action Alternatives

### 2.2.6.1 Silviculture

Monitoring for forest vegetation should include monitoring for timber harvest, non-commercial treatments, regeneration, and prescribed burning. Monitoring for commercial harvest includes monitoring the timber marking completed by Forest Service marking crews to ensure proper leave tree composition and density are maintained. This will be conducted through silviculture personnel measuring variable radius plots for select units and through BMFP monitoring field trips to analyze the variable density prescriptions. It also includes monitoring of any Designation by Prescription harvesting completed by contractors that may take place for the 10-year Stewardship Contract to ensure silvicultural objectives are met and contract specifications are followed. Monitoring of non-commercial treatments includes monitoring contract compliance for non-commercial thinning, fuels treatments, biomass removal, and/or post and pole removal, as well as monitoring Forest Service crews who complete this work to ensure silvicultural objectives are met. Prescribed burning would be visually monitored to ensure that widespread mortality levels do not exceed mortality limits as described in the silviculture prescription directly after burning. Mortality would also be assessed several years after burning to determine trends in mortality and the apparent causes of those trends.

### 2.2.6.2 Botany

Project design criteria should provide sufficient protection to sensitive plant populations and potential habitat in the project planning area. However, implementation monitoring is recommended for some sensitive plant populations for this project. This would include site visits to populations during and after project implementation. This monitoring would help to ensure that project design criteria are followed, and that they are effective in preventing negative effects to sensitive plant populations and sensitive plant habitat. It would also allow an opportunity to confirm that the assumptions used for development of the project design criteria are correct. For example, a revisit to areas buffered a certain distance from activities would confirm if the distance is sufficient to prevent blow down, or unacceptable changes in hydrology or sunlight.

## 2.3 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). 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 the purpose and need for the Magone Project, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

### 2.3.1 Build horse trails and corrals

During an open house on the Magone Project, attendees brought forward the idea of constructing a horse camp by Magone Lake to use the lake for watering horses and recreate on horseback in the area. However, horses are not permitted within the Magone recreation area. Letting horses into the Magone Lake recreation area would change the recreation experience for other users at this site. In addition, horse droppings and trampling along the edge of the lake would cause water quality issues.

The Magone interdisciplinary team considered alternatives for a horse camp at other locations within the project planning area but did not identify an appropriate location.

The hiking/biking trails proposed under the action alternatives for this project would not be designed for horse riding; horse trails need to be wider and designed differently than hiking/biking trails. However, horse riders would not be restricted from using these trails.

### 2.3.2 Magone Lake loop trail—make it wheelchair accessible

A comment was received to make the existing loop trail around Magone Lake wheelchair accessible. Creating a trail around the lake that meets Americans with Disabilities Act (ADA) standards includes the following requirements: surface characteristics (firm and stable), width (36 inches minimum), passing spaces (60 by 60 inches every 1,000 feet), slope (no more than 30 percent of the total length of a trail shall have a slope steeper than 1:12 or 8.33 percent), and cross slope (shall not be steeper than 1:48). This would require relocating the existing trail around the lake and making a wider path, which would cause detrimental water quality impacts to the lake.

Instead, an element was added to alternatives 2 and 3 to increase the length of wheelchair accessible trail around the lake to a point that provides a view along the longest portion of the lake.

### 2.3.3 Magone Lake loop trail—allow bikes on the trail

Comments were received requesting that bikes be allowed on the trail around Magone Lake. This was considered but eliminated from detailed study due to concerns about water quality impacts and safety. In addition, this trail already receives a high level of use from hikers, and adding bicycles to this use is a safety concern.

### 2.3.4 Driving for pleasure—loop opportunities

Several comments were received from members of the public expressing interest in motorized loop opportunities. The interdisciplinary team looked at potential motorized loop opportunities on roads in the project planning area, but did not identify any beyond what already exists. There is not much opportunity for additional driving loops because a large portion of the project planning area includes the Nipple Butte Inventoried Roadless Area, which dominates the western portion of the project planning area. Some existing routes (which include routes on roads designed for high-clearance vehicles) include:

- County Road 18, FSR 36, FSR 3618, FSR 3620, returning to County Road 18
- County Road 18, FSR 3600-237, FSR 36, FSR 3620, returning to County Road 18
- US-395, County Road 32, FSR 3618, FSR 3620, County Road 18, FSR 1800-484, FSR 3947, FSR 3940, returning to US-395

The team will also forward the idea of developing a map of existing motorized loop opportunities to the recreation department. It is outside the scope of the Magone Project to develop this type of map.

### 2.3.5 Driving for pleasure—auto tour

The interdisciplinary team considered adding an auto tour through the area with interpretive signs focused on forest management, fire, and restoration. A portal sign could be placed in the 4 Corners area, when entering the project planning area, to highlight the work going on in several accelerated restoration project planning areas (e.g., Magone, Camp Lick, and 18 Road projects). This alternative was scaled back to include interpretive signs at 4 Corners, Magone Lake Trail, and Slide Trail under alternatives 2 and 3.

### 2.3.6 Create OHV trails at the east end of the planning area

Several commenters requested that OHV trails be created at the east end of the project planning area. The interdisciplinary team looked at the existing open and closed road system in the Magone project planning area and did not identify any opportunities to create OHV trails because many of the loop opportunities are along busy routes where safety is a concern, and many of the closed roads are either spur roads or immediately adjacent to streams (where sediment inputs are a concern). Closed roads often become revegetated following harvest and may not require re-entry for decades. Allowing OHV use on these roads would slow the revegetation process resulting in chronic sediment inputs to adjacent streams that would otherwise not be likely to occurr.

### 2.3.7 Allow OHV use in Magone Lake recreation area

Comments were received asking that OHVs be allowed within the Magone Lake recreation area to access FSR 3618 and other roads. FSR 3618 is currently closed to OHV use due to safety concerns; this road and many other forest roads lack good sight distances. In addition, OHV use within the Magone Lake recreation area would alter the current rustic experience that Magone is known for and generate noise disturbance to existing recreational uses.

### 2.3.8 Designate cross-country ski trails

A comment was received requesting that cross-country ski trails be designated in the Magone project planning area. No specific routes or types of routes were identified by this commenter and the interdisciplinary team did not identify any potential routes. However, cross-country skiing is allowed throughout the Malheur National Forest, not just on designated trails.

### 2.3.9 Turn lesser-used and closed roads into trails

A commenter recommended eliminating all new trail construction and instead designate trails on existing closed and lesser-used roads. The interdisciplinary team did not move this recommendation forward under an alternative because roads and trails are designed for different purposes and using different design specifications. Many closed and lesser-used roads are short spur roads that do not provide viewpoints, destinations, or loop opportunities that hikers and bikers look for in a trail. However, several of the trail proposals analyzed under the action alternatives include portions of a trail being co-designated along a road with additional trail construction.

### 2.3.10 More trails within the wildlife emphasis area and Nipple Butte IRA

Part of the trail developments scoped for the Magone Project were dropped from the proposed action in response to public comments expressing concerns at the amount of trail being proposed in the Nipple Butte IRA and the wildlife emphasis area (which is located in the southern part of the Nipple Butte IRA); although trail construction is allowed within the wildlife emphasis area and Nipple Butte IRA under the Malheur Forest Plan and 2001 Roadless Area Conservation Rule, respectively. The interdisciplinary team reduced the amount of trails in these areas under alternatives 2 and 3 (focusing trail construction in the northern portion of the IRA), and analyzed even fewer trails within these areas under alternative 4. Under alternatives 2 and 3, more trails are proposed in the eastern part of the Magone project planning area—outside of the IRA and wildlife emphasis area.

### 2.3.11 Co-designate bike and OHV trails

A commenter recommended that OHV trails be co-designated with bicycle trails. Bicycle trails and OHV trails would be constructed using different trail specifications and locations, and mixing bicycle and OHV use on trails designed for bicycles would be unsafe. The District will consider OHV trail designation/development in future project planning areas.

### 2.3.12 Commercial timber harvest in the Nipple Butte IRA

Several commenters requested that the interdisciplinary team identify more areas for commercial harvest, including in the Nipple Butte IRA. The team considered this recommendation and identified a few additional areas for commercial harvest in the IRA (along existing roads in the IRA). However, extensive commercial harvest in the IRA is not feasible. Timber harvest in an IRA can only be proposed under certain limited circumstances based around improving or maintaining the characteristics of the IRA. In addition, road construction within an IRA is limited to certain circumstances that do not exist for this project (see the 2001 Roadless Area Conservation Rule). One commenter recommended that ground-based logging equipment could be walked into the IRA without roads; however, ground-based equipment can only operate on slopes up to 30 percent and much of the timbered ground in the IRA exceeds 30 percent slope.

This leaves the option of helicopter logging, which is not financially feasible given the volume that would be harvested while meeting the 2001 Roadless Area Conservation Rule requirements for timber harvest within an IRA

## 2.4 Comparison of Alternatives

### 2.4.1 Summary Comparison of Alternatives

Table 11 provides a comparison between the alternatives.

### 2.4.2 Summary of Effects by Alternative

This section provides a summary of the effects of implementing each alternative. Information in Table 12 is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

**Table 11. Comparison of elements between all alternatives**

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Silviculture treatments** | | | | |
| commercial and non-commercial thinning | -- | 3,307 acres<br>77 units | 5,918 acres<br>142 units | 2,925 acres<br>79 units |
| commercial and non-commercial thinning, leave stand denser | -- | 778 acres<br>14 units | 751 acres<br>14 units | 394 acres<br>8 units |
| commercial and non-commercial thinning, with re-designation from dedicated old growth (DOG) to replacement old growth (ROG) | -- | 223 acres<br>4 units | 223 acres<br>4 units | -- |
| post and pole removal | -- | 378 acres<br>6 units | 292 acres<br>4 units | 251 acres<br>5 units |
| non-commercial thinning | -- | 6,148 acres<br>177 units | 5,906 acres<br>173 units | 1,917 acres<br>53 units |
| non-commercial thinning, with designation as ROG | -- | 1,039 acres<br>5 units | 270 acres<br>4 units | -- |
| conifer reduction in aspen stands | -- | 18 acres<br>7 units | 18 acres<br>7 units | 18 acres<br>7 units |
| biomass removal<br>*excludes acres that would be non-commercially thinned within the Nipple Butte IRA under alternatives 2 and 3 | -- | up to 8,954 acres | up to 10,458 acres | up to 5,505 acres |
| *total acres treated* | -- | 11,872 acres<br>283 units | 13,378 acres<br>348 units | 5,505 acres<br>152 units |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| ***Commercial harvest*** | | | | |
| total number of acres<br>**Does not total commercial silviculture treatment unit acres because some commercial and non-commercial thinning units have very limited amount of commercial material and would be predominately non-commercially thinned.* | -- | 4,686 acres<br>101 units | 7,184 acres<br>164 units | 3,570 acres<br>92 units |
| total number of acres of tractor harvest | -- | 3,677 acres<br>82 units | 5,650 acres<br>132 units | 2,955 acres<br>76 units |
| total number of acres of skyline harvest | -- | 333 acres<br>8 units | 305 acres<br>8 units | 243 acres<br>7 units |
| total number of acres with a combination of tractor and skyline harvest | -- | 675 acres<br>11 units | 1,229 acres<br>24 units | 372 acres<br>9 units |
| estmated volume (million board feet [mmbf]) | -- | 14 MMBF | 16 MMBF | 9 MMBF |
| ***Activity fuels treatments within silvicultural treatment units*** | | | | |
| total number of acres whole tree yarding and/or cut to length, grapple piling and/or hand piling, and pile burning | -- | 4,686 acres<br>101 units | 7,184 acres<br>164 units | 3,570 acres<br>92 units |
| total number of acres with grapple piling and/or hand piling and pile burning | -- | 4,391 acres<br>111 units | 3,230 acres<br>103 units | 1,917 acres<br>53 units |
| total number of acres with hand piling and pile burning only | -- | 2,936 acres<br>77 units | 2,964 acres<br>81 units | 18 acres<br>7 units |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Prescribed burning** | | | | |
| prescribed burning alternative description | -- | Includes the potential for planned ignitions in the entire project area and then some. Planned ignitions can occur in the winter, spring, summer, or fall. unplanned ignitions can occur any season. | Planned ignitions can occur in the winter, spring, summer, or fall for units 1, 2, 3, 4, 5, and 8. Planned ignitions in unit 6 and 7 will likely occur in the fall only and make up most of the IRA. This alternative is in response to comments received about spring burning. Additionally, fall burning may provide for some opportunity to implement different strategies in difficult terrain. Unplanned ignitions can occur any season. | Planned ignitions can occur in the winter, spring, summer, or fall for units 1, 2, 3, 4, 5, and 8. Planned ignitions will not be allowed in units 6 and 7 which make up most of the IRA. Unplanned ignitions that will meet prescribed burning objectives specified in the silviculture prescription will be managed in units 6 and 7. Unplanned ignitions can occur any season. |
| potential for planned ignitions in winter, spring, summer, or fall | -- | 28,500 acres | 28,500 acres<br>**11,300 acres in the Nipple Butte IRA would likely be fall only planned ignitions.* | 17,200 acres |
| **Recreation** | | | | |
| total length of new trails | -- | 54.0 miles | 96.3 miles | 15.4 miles |
| hiking / bicycle trail new construction | -- | 42.2 miles | 83.2 miles | 9.7 miles |
| hiking / bicycle trails designated on existing roads | -- | 10.4 miles | 11.7 miles | 4.3 miles |
| hiking only trail new construction | -- | 1.4 miles | 1.4 miles | 1.4 miles |
| existing trails to un-designate | -- | 3.9 miles | 3.9 miles | 3.9 miles |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| accessible trail development | -- | Make existing trail from campground to north end of lake accessible (approximately 0.2 miles of trail improvement). Develop a new day use site on north side of lake (at the end of this trail improvement) with picnic table and interpretive sign. | Make existing trail from campground to north end of lake accessible (approximately 0.2 miles of trail improvement). Develop a new day use site on north side of lake (at the end of this trail improvement) with picnic table and interpretive sign. | No developments |
| trailhead developments | -- | Improve existing Nipple Butte and Lake Butte trailheads.<br>Construct new trailhead at Four Corners. | Improve existing Nipple Butte and Lake Butte trailheads.<br>Construct new trailhead at Four Corners and near junction of FSR 3618-064 and 3618-125 (Tinker Creek trailhead). | Improve existing Nipple Butte and Lake Butte trailheads. |
| interpretive signs | -- | Place interpretive signs:<br>• Along Slide Trail about the slide the created Magone Lake.<br>• East side of Magone Lake about the slide that created Magone Lake.<br>• Four Corners about fire, heritage, range, and vegetation types in the area.<br>North side of Magone Lake about beaver activity. | Place interpretive signs:<br>• Along Slide Trail about the slide the created Magone Lake.<br>• East side of Magone Lake about the slide that created Magone Lake.<br>• Four Corners about fire, heritage, range, and vegetation types in the area.<br>North side of Magone Lake about beaver activity. | No new interpretive signs. |
| day use boat dock (southwest corner of lake) | -- | Modify existing to be more functional and with a more rustic appearance | Modify existing to be more functional and with a more rustic appearance | Modify existing to be more functional and with a more rustic appearance |
| campground boat mooring (northwest corner of lake) | -- | Replace with handicap accessible boat mooring | Replace with handicap accessible boat mooring | Replace with handicap accessible boat mooring |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| fishing dock (east side of lake) | -- | Place new fishing dock along east side of lake | Place new fishing dock along east side of lake | -- |
| Off-highway vehicle (OHV) use | -- | -- | OHV use designated on FSR 36 to 4 Corners. | -- |
| **Magone Lake restoration activities** | | | | |
| fish cribs | -- | Place 15-20 fish cribs throughout lake | Place 15-20 fish cribs throughout lake | Place 5-10 fish cribs in 2 clusters |
| fish sticks | -- | Place 70-100 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH | Place 70-100 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH | Place 40-70 fish sticks in singles and clusters of 5-7 sticks of trees mostly 8-12 inches DBH |
| **Road activities** | | | | |
| ***Temporary road construction and road maintenance*** | | | | |
| miles of temporary road construction | -- | 8.5 miles<br>29 road segments | 12.9 miles<br>49 road segments | 8.1 miles<br>28 road segments |
| road maintenance for haul | -- | 77.7 miles<br>78 road segments | 98.5 miles<br>105 road segments | 77.2 miles<br>77 road segments |
| closed roads to be temporarily opened for haul<br>**this number is included in the mileage for "road maintenance for haul" and is not additive* | -- | 28.7 miles<br>45 road segments | 46.9 miles<br>68 road segments | 28.5 miles<br>45 road segments |
| ***Road system changes*** | | | | |
| miles of new road closures | -- | 1.1 miles<br>4 road segments | 0.3 miles<br>2 road segments | 0.3 miles<br>2 road segments |
| close currently open road and co-designate as a trail and maintenance level 1 road | -- | 1.4 miles<br>2 road segments | -- | -- |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| convert closed road to trail | -- | 1.2 miles<br>1 road segment | -- | -- |
| *co-designate existing road as a trail (this activity would not change existing open road system)* | -- | *4 miles*<br>*8 road segments* | *9.5 miles*<br>*15 road segments* | *1.3 miles*<br>*3 road segments* |
| miles of road decommissioning | -- | 0.3 miles<br>1 road segment | 0.3 mile<br>1 road segment | 0.3 mile<br>1 road segment |
| **Other activities** | | | | |
| Forest Plan amendment to change old growth boundaries | -- | Yes | Yes | Yes |
| Forest Plan amendment to reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) cover below Malheur Forest Plan standards | -- | Yes | Yes | No |
| retention of snags, except danger trees | -- | 100% | 100% | 100% |
| activities planned within old growth areas: dedicated old growth (DOG), replacement old growth (ROG), and pileated woodpecker feeding area (PWFA) | -- | 223 acres (4 units) of commercial and non-commercial thinning, with re-designate from DOG to ROG<br>1,039 acres (5 units) non-commercial thinning, with designation as ROG<br>Direct ignition during prescribed burning will not occur within DOGs, ROGs, or PWFAs but these are part of larger burn blocks and fire may back into them | 223 acres (4 units) of commercial and non-commercial thinning, with re-designate from DOG to ROG<br>270 acres (4 units) non-commercial thinning, with designation as ROG<br>Direct ignition during prescribed burning will not occur within DOGs, ROGs, or PWFAs but these are part of larger burn blocks and fire may back into them | Direct ignition during prescribed burning will not occur within DOGs, ROGs, or PWFAs but these are part of larger burn blocks and fire may back into them |

| Project activity | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| activities planned within riparian habitat conservation areas (RHCAs) | -- | 5 temporary road crossings of Category 4 streams<br>Decommission 0.3 miles of road<br>Close 0.3 miles of road<br>Road maintenance and use on 14.9 miles of road within 100 feet of RHCAs<br>34 trail crossings of RHCAs and 3.2 miles of trail within 100 feet of RHCAs | 6 temporary road crossings of Category 4 streams<br>Decommission 0.3 miles of road<br>Close 0.15 miles of road<br>Road maintenance and use on 17.8 miles of road within 100 feet of RHCAs<br>78 trail crossings of RHCAs and 6.6 miles of trail within 100 feet of RHCAs | 4 temporary road crossings of Category 4 streams<br>Decommission 0.3 miles of road<br>Close 0.14 miles of road<br>Road maintenance and use on 14.8 miles of road within 100 feet of RHCAs<br>8 trail crossings of RHCAs and 1.1 miles of trail within 100 feet of RHCAs |
| activities planned within Nipple Butte Inventoried Roadless Area (IRA) | -- | 11 acres commercial and non-commercial thinning<br>2,908 acres non-commercial thinning<br>746 acres non-commercial thinning with designation as Replacement Old Growth<br>0.2 acres conifer reduction in aspen stands<br>Up to 10,112 acres (all spring or fall underburning)<br>Convert 0.6 miles of road to trail<br>Close 0.9 miles of road and co-designate as trail<br>Close 0.2 miles of road<br>Construct 19 miles of hiking/biking trails<br>Construct 0.4 miles of hiking only trail | 306 acres commercial and non-commercial thinning<br>2,915 acres non-commercial thinning<br>10 acres non-commercial thinning with designation as Replacement Old Growth<br>0.6 acres conifer reduction in aspen stands<br>Up to 10,112 acres (1,405 acres spring or fall, and 8,707 acres fall only underburning)<br>Close 0.2 miles of road<br>Construct 32.3 miles of hiking/biking trails<br>Construct 0.4 miles of hiking only trail | 0.6 acres conifer reduction in aspen stands<br>Up to 1,405 acres (all spring or fall underburning)<br>Close 0.2 miles of road<br>Construct 7.2 miles of hiking/biking trails<br>Construct 0.4 miles of hiking only trail |

**Table 12. Comparison of environmental effects by alternative**

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| **Level and effects of silviculture treatments** | | | | |
| Percentage change of structural stages in relation to the historical range of variability (HRV) | *Warm Dry plant association group (PAG)* – old forest multi strata (OFMS) would continue to be above HRV, after 40 years the PAG would be deficient in young forest structure (stand initiation [SI]) decreasing to the lower limit of young forest multi strata (YFMS) and just attaining the lower limit of old forest single stratum (OFSS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Warm Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). |
| | *Hot Dry PAG* – Currently, OFSS is below HRV. While it is projected to increase, the model does not have it increasing to within the historic range in 40 years. Young forest and SI are modeled to decrease over time. Stem exclusion open canopy (SEOC) stands move toward HRV, but are still well above HRV. | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be well within HRV, after 40 years the PAG would be deficient in YFMS structure, SI structure would increase, and SEOC structure would decrease to be closer to HRV. | *Hot Dry PAG* – OFMS would continue to be above HRV, OFSS would increase to be close to HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). |
| | *Cool Moist PAG* – Currently, OFSS is slightly higher than HRV. Over time, the model has OFSS moving in and out of HRV. OFMS, however exceeds HRV, and keeps | *Cool Moist PAG* – OFMS would continue to be above HRV (although it does decrease slightly over 40 years), OFSS would increase to be well above HRV, and after 40 | *Cool Moist PAG* – OFMS would continue to be above HRV (although it does decrease slightly over 40 years), OFSS would increase to be well above HRV, and after 40 years the PAG would | *Cool Moist PAG* – OFMS would continue to be above HRV, OFSS would increase to be well above HRV, after 40 years the PAG would be deficient in YFMS and UR, and SI would be within HRV |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | increasing over time. The younger strata decrease over time, with YFMS and understory reinitiation (UR) moving below HRV. | years the PAG would be deficient in young forest structure (SI and YFMS). | be deficient in young forest structure (SI and YFMS). | (but stay on the lower side of the range). |
| | *Cold Dry PAG* – The structures represented in this PAG represents a small portion of the planning area. The overall trend of Old Forest stratum is to increase above HRV, at the same time most of the other strata are moving into, or closer to the historical levels. | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, and after 40 years the PAG would be deficient in young forest structure (SI and YFMS). | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, after 40 years the PAG be deficient in YFMS, and SI would increase and stay within HRV. | *Cold Dry PAG* – OFMS would continue to be within HRV, OFSS would increase to be well above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly over time and stay within HRV. |
| | *Warm Moist PAG* – This PAG make up a small portion of the project planning area. While currently the old forest strata are within HRV, modeling shows those strata increasing to double and triple HRV, and younger forest strata going below HRV. | *Warm Moist PAG* – OFMS would rise to be above HRV, OFSS would increase to slightly above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly (but stay on the lower end of HRV). | *Warm Moist PAG* – OFMS would stay static, OFSS would increase to above HRV, after 40 years the PAG would be deficient in YFMS, and SI would increase slightly (but stay on the lower end of HRV). | *Warm Moist PAG* – OFMS would rise above HRV, OFSS would increase above HRV, and after 40 years the PAG would be deficient in YFMS and SI. |
| Percentage change of acres above the management zone (MZ), within the MZ, and below the MZ in 40 years as defined by maximum stand density index (MaxSDI) | *Warm Dry PAG* – 96% above the MZ, 3% within the MZ<br>*Hot Dry PAG* – 78% above the MZ, 6% within the MZ<br>*Cool Moist PAG* – 99% above the MZ, 0% within | *Warm Dry PAG* – 69% above the MZ, 17% within the MZ<br>*Hot Dry PAG* – 50% above the MZ, 18% within the MZ<br>*Cool Moist PAG* – 68% above the MZ, 9% within | *Warm Dry PAG* – 59% above the MZ, 20% within the MZ<br>*Hot Dry PAG* – 48% above the MZ, 19% within the MZ<br>*Cool Moist PAG* – 54% above the MZ, 7% within the MZ<br>*Cold Dry PAG* – 58% above the MZ, 23% within the MZ | *Warm Dry PAG* – 81% above the MZ, 10% within the MZ<br>*Hot Dry PAG* – 74% above the MZ, 9% within the MZ<br>*Cool Moist PAG* – 87% above the MZ, 3% within the MZ |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | the MZ<br>*Cold Dry PAG* – >99% above the MZ, 1% within the MZ<br>*Warm Moist PAG* – 96% above the MZ, 3% within the MZ | the MZ<br>*Cold Dry PAG* – 65% above the MZ, 15% within the MZ<br>*Warm Moist PAG* – 74% above the MZ, 11% within the MZ | *Warm Moist PAG* – 62% above the MZ, 12% within the MZ | *Cold Dry PAG* – 74% above the MZ, 8% within the MZ<br>*Warm Moist PAG* – 83% above the MZ, 7% within the MZ |
| Acres mechanically treated | 0 acres | 11,872 acres | 13,378 acres | 5,505 acres |
| Viability of harvest | N/A | Commercial harvest shows positive bid rates producing a viable harvest, $371,501 is the estimated revenue from the sale. | Commercial harvest shows positive bid rates producing a viable harvest, $455,258 is the estimated revenue from the sale. | Commercial harvest shows positive bid rates producing a viable harvest, $251,644 is the estimated revenue from the sale. |
| 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. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (107 jobs) would occur for 2 years.<br>This alternative would generate $2,987,505 in direct, indirect, and induced local income. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (164 jobs) would occur for 2 years.<br>This alternative would generate $4,580,008 in direct, indirect, and induced local income. | Short-term economic relief by providing commercial saw logs and biomass. Harvest related employment (82 jobs) would occur for 2 years.<br>This alternative would generate $2,275,992 in direct, indirect, and induced local income. |
| Economic efficiency | The public would incur no costs, nor realize any benefits. | A present net value of $-292,092, with a net value per acre of $-62 would be experienced this alternative. | A present net value of $-189,035, with a net value per acre of $-26 would be experienced this alternative. | A present net value of $-153,352, with a net value per acre of $-43 would be experienced this alternative. |
| Estimated volume (million board feet [mmbf]) | -- | 14 MMBF | 16 MMBF | 9 MMBF |
| **Recreation developments** | | | | |
| Recreation opportunity spectrum (ROS) | Area surrounding the Magone Lake recreation | The proposed actions are intended to enhance the visitor experience by improving and creating recreation opportunities that are compatible with the ROS and consistent with the | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | area would continue to be classified as Roaded Natural under the ROS. | Malheur Forest Plan. The area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. | | |
| Recreation opportunities | The no action alternative would perpetuate existing conditions in the Magone project planning area. Attractive mountain biking opportunities would continue to be nonexistent, as the trails on roads that currently exist were designed for vehicles, not bicycles. The fishing and boating opportunities at Magone Lake would not be improved. | Silviculture (11,872 acres) and prescribed burning treatments (up to 28,500 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 48.8 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and a new trailhead at Four Corners. | Silviculture (13,378 acres) and prescribed burning treatments (up to 28,500 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 92.4 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and new trailheads near the junction of FSR 3618-064 and 3618-025 and at Four Corners. | Silviculture (5,505 acres) and prescribed burning treatments (up to 17,200 acres) would reduce the fire risk to developed recreation and the surrounding recreational setting.<br>Fish habitat improvements would serve to enhance fishing opportunities, although less than experienced under alternatives 2 and 3 due to a smaller number of fish sticks and logs being placed.<br>Trail developments would significantly increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. The opportunities would be created through 11.9 miles of new trail, and improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road |
| Public access to recreation | Recreational use of forest roads would not be immediately affected, as there would not be any changes to the existing road system.<br>The continued buildup of | Recreational use of forest roads would be minimally affected with 2.5 miles of road being closed and 0.3 miles of road being decommissioned.<br>Recreational driving would | Recreational use of forest roads would be minimally affected with 0.3 miles of road being closed and 0.3 miles of road being decommissioned.<br>Recreational driving would benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest. | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | fuel loads along escape corridors from the Magone Lake recreation area would have the indirect effect of decreasing safety in the Magone Lake recreation area by increasing the risk of uncharacteristic fire along these routes. | benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest. | | |
| **Impacts to the Nipple Butte Inventoried Roadless Area** | | | | |
| Effects on nine characteristics of inventoried roadless areas (IRAs) | There would be no direct or indirect effects to the Nipple Butte IRA because no activities would occur. The existing condition would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. Growth rates of trees would continue to decline, and natural processes that affect tree vigor and changes in stand structure would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within forest stands, which would result in larger acreages of blackened landscapes | *High quality or undisturbed soil, water, and air* – Alternative 2 is likely to result in the most detrimentally affected soils and effects to site productivity from disturbance related to approximately 3,660 acres of commercial and non-commercial thinning, and construction of approximately 19 miles of new trail. Detrimental impacts to water are not expected. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan. | *High quality or undisturbed soil, water, and air* – Alternative 3 is likely to result in the second most detrimentally affected soils and effects to site productivity from disturbance related to approximately 3,230 acres of commercial and non-commercial thinning, and construction of approximately 33 miles of new trail. Detrimental impacts to water are not expected. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan. | *High quality or undisturbed soil, water, and air* – Effects on soils under alternative 4 are expected to be negligible; no silviculture treatments are proposed, 0.4 miles of road decommissioning is expected to increase soil productivity; and trail development is expected to detrimentally impact negligible acres of soil. Detrimental impacts to water are not expected; however, fuel loads would remain high and may result in high-severity burns that would impact water quality. Any smoke from prescribed fire treatments would comply with the State of Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | compared to prescribed fires. Fire is a natural occurrence and expected disturbance process in this landscape. | | | this plan. |
| | | Sources of public drinking water – There are no public drinking water sources identified in the Magone project planning area. | | |
| | | Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land –<br>Plants – Since known and potential locations of plant species would be avoided during implementation, there would be no direct or indirect effects under alternatives 2, 3, and 4.<br>Terrestrial Wildlife – The project “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” for Pallid bat, Townsend’s big-eared bat, fringed myotis, bufflehead, bald eagle, Lewis’s woodpecker, white-headed woodpecker, and Johnson’s hairstreak; and would have “No Impact” for American peregrine falcon and silver-bordered fritillary. In the long-term, alternatives 2 and 3 would have a “Beneficial Impact” on bald eagles, Lewis’s woodpeckers, white-headed woodpeckers, and Johnson’s hairstreaks. Implementation of any alternative would not result in significant, incremental adverse effects on Management Indicator Species or their habitat within the project planning area. No adverse effects are expected to featured species. Effects to neo-tropical migratory birds are variable depending on the habitat associations of the individual species and effects to habitats; impacts to habitat for some species may occur from vegetation management of forests; however, due to the limited amount of area affected by the action alternatives, effects to neo-tropical migratory birds are expected to be minimal.<br>Aquatic Species – For all action alternatives, the project, “May Effect, Likely to Adversely Affect short-term; Beneficial Effect long-term” and “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” short-term; “Beneficial Impact” long-term” for Mid-Columbia River steelhead; “May Effect, Likely to Adversely Affect” short-term; “Beneficial Effect” long-term for Middle Columbia River steelhead designated critical habitat. For all action alternatives, the project “May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species” short-term; “Beneficial Impact” long-term for Interior redband trout, westslope cutthroat trout, and Columbia spotted frog.<br>Current climate projections predict a transition from a snowpack driven system to a rain driven system for streams within the project planning area. This transition would likely result in an increase in the occurrence and magnitude of “flashy” flow regimes and “scour” events during critical spawning and fry emergence times for Mid-Columbia River steelhead and | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | | Westslope cutthroat trout within East Fork Beech Creek and its tributaries. Three tributaries that originate within the Nipple Butte IRA are the primary contributers of flow to East Fork Beech Creek listed in order of contribution for perennial flow (McClellan Creek, Clear Creek, and Thompson Creek).<br>Foreseeable aquatic restoration actions proposed within the Nipple Butte IRA focus on areas identified for their importance related to water storage, spawning/rearing habitat, and stream energy dissipation. Characteristics of these areas include wide depositional valleys formed by landslides or geological pinch points and debris jams. The current existing condition of these areas include incised stream channels, over-widened stream channels,lack of woody debris and channel roughness, absence of riparian hardwoods and beaver. These types of valley bottoms also have a high likelihood of occupancy by beaver when suitable cover and forage is available. Beaver can create “gaining” reaches of stream (discontinuities) within “losing” reaches of stream.<br>Perennial flow within East Fork Beech Creek and some of its tributaries are one of the major limiting factors within the watershed for Mid-Columbia River steelhead and other aquatic dependent species. Aquatic restoration actions may have adverse effects in the short-term (large and coarse wood placement, beaver habitat improvement) as described within the Malheur National Forest Aquatic Restoration Decision and Aquatic Restoration Biological Opinion II (ARBO II) but with implementation of project design criteria (PDCs) associated with these documents these affects are expected to be minimized and of short duration.<br>Increasing water storage capacity through sediment deposition and energy dissipation within incised stream channels and reconnection of floodplains is expected to result in a long-term benefit related to perennial flow within these tributaries in the Nipple Butte IRA. Establishment of suitable soils and depositional areas for riparian hardwoods within the depsitional valley bottoms is expected to result in an increase in shade and an increase in the likelihood of beaver colonization which would also increase water residence times for the tributaries.<br>The beneficial impacts are related to conifer /juniper reduction within the IRA that have altered hydrological processes related to water/sediment transport and storage and have partially contributed to degraded conditions within downslope Mid-Columbia River steelhead, redband trout, Westslope cutthroat trout, and Columbia spotted frog habitat. The primary limiting factor for aquatic species within the Magone Project planning area is water storage and release.<br>Riparian and upland systems are connected not only through the upland/riparian interface but through processes that often begin from surrounding ridglines and hillslopes. Vegetative characteristics within the Nipple Butte IRA consist of scab areas on ridgetops (see photograph on title page of this document) that have become dominated by encroaching | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | | juniper. Historically these areas consisted of a mixture of bunch grasses, bitter brush, and mountain mahogany, with scattered juniper found within rock scabs inaccessible to fire. Changes in vegetation, as a result of fire suppression and to some extent past livestock/sheep grazing has also altered sediment and water flow and transport patterns (expedited) within these upslope areas above riparian areas and thus impacted channel characteristics downslope.<br>Removal of encroaching juniper and conifers and restoration of characteristic fire within these areas is expected to result in a short-term increase in sediment transport. PACFISH riparian buffers and placement of large/coarse wood, as well as beaver dam analogs, is expected to capture the majority of this sediment and recover incised channels and reconnect floodplains in downstream reaches. This will expedite recovery of these areas in the long-term and increase water storage capacity through sediment deposition and dissipation of stream energy within the channel and the floodplain.<br>Restoration of these characteristics within the three tributaries in the Niplpe Butte IRA is expected to benefit downstream reaches of East Fork Beech Creek outside the Nipple Butte IRA that in their existing condition go dry periodically. This drying results in a net loss of 1,000 offspring per steelhead redd with a 5 year average of 4.9 redds in East Fork Beech Creek. However, redd counts as high as 90 have been documented within East Fork Beech Creek. | | |
| | | *Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation* – The Nipple Butte IRA is primarily designated for providing semi-primitive motorized recreation in the project planning area. Effects to semi-primitive classes of recreation, including isolation from the sights and sounds of man, would be affected by the increase of human presence and activity during the time of proposed treatments (i.e., mechanical treatments, prescribed burning) under alternatives 2 and 3.<br>The opportunity to enjoy semi-primitive, non-motorized recreational experiences would increase in the long-term. Under alternative 2, trail developments would greatly increase the hiking and bicycling opportunities; there would be a moderate distance of new trail (19.4 miles) built. Under alternative 3, trail developments would significantly increase the hiking and bicycling opportunities with 32.7 miles of new trail. | | *Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation* – Effects under alternative 4 from silviculture and prescribed burning treatments would be greatly reduced since no silvicultural treatments are proposed under this alternative and prescribed burning would be implemented on only 1,405 acres within the IRA.<br>Trail developments would somewhat improve the hiking and bicycling opportunities with a very |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | | | | small distance of new trail (7.6 miles). |
| | | *Natural appearing landscapes with high scenic quality; Reference landscapes* – There would be some visual effects to the landscape. Stumps would be visible in all treated units within the IRA. Various lengths of new recreation trails would be constructed. However, the objectives and guidelines associated with the visual quality objectives for each management strategy intersecting a treatment area would be met. Short-term acceptable effects from treatments are recognized and long-term enhancement to the visual landscape is expected.<br>For the effects to Reference Landscapes refer to the effects of silviculture treatments and effects of prescribed burning below. | | *Natural appearing landscapes with high scenic quality; Reference landscapes* – There would be no mechanical impacts within the IRA. There would be limited direct visual effects to the landscape from trail construction. The objectives and guidelines associated with the visual quality objectives for each management strategy would be met.<br>For the effects to Reference Landscapes refer to the effects of silviculture treatments and effects of prescribed burning below. |
| | | *Traditional cultural properties and sacred sites* – All traditional cultural properties and sacred sites would be avoided under alternatives 2, 3, and 4. Therefore, there would be no direct or indirect effects to traditional cultural properties and/or sacred sites. | | |
| | | *Other locally identified unique characteristics* – There are no other locally identified unique characteristics in the Magone project planning area. | | |
| Effects of silviculture treatments | Without entering the Nipple Butte IRA, many acres of overstocked forest would be left unmanaged. Previous fire suppression and other activities have led to encroachment of species that would have been regularly thinned naturally | The majority of the Nipple Butte IRA is composed of WarmDry and Hot Dry PAGS, within which the old forest structure (OFSS & OFMS) would increase overtime to be within (OFSS) or above (OFMS) HRV. Young forest in the Warm Dry PAG would be | The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 3 and | The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | with fire suppression. Both in and out of the IRA, this has led to stocking levels and species compositions different to what would have occurred historically.<br>Sixty percent of the old forest structure (OFSS and OFMS) within the project planning area is within the Nipple Butte IRA. In the Hot Dry and Warm Dry PAGs, which cover 66 percent of the project planning area, if no actions are taken, those PAGs would double their current range, increasing overstocking in old forest types, which might lead to these areas having a greater chance of uncharacteristic wildfire or insect infestation. Younger structural stages would decrease over time in the Warm Dry and Hot Dry PAGs, decreasing to below HRV.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with OFSS moving in and out of HRV, OFMS exceeding HRV and increasing over time, and the younger strata decreasing over | below or on the low side of HRV, and in the Hot Dry PAG SI would be well above the historic range.<br>The pocket of Cool Moist would follow the trend of Old Forest structure increasing and remaining well above HRV, and young forest would be decreasing to below HRV. | OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055, similar to what would be seen under alternative 2.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends of old forest structure increasing and remaining well above HRV, with more OFSS and less OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2. | alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055, similar to what would be seen under alternative 2. Young forest structure in the Hot Dry PAG would also be below or on the lower end of HRV in 2055, in contrast to the increase in SI to well above HRV that would be seen under alternative 2.<br>The pocket of Cool Moist in the “thumb” of the IRA would follow the trends of old forest structure increasing and remaining well above HRV, with significantly less OFSS and OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | time (with YFMS and UR moving below HRV). | | | |
| Effects of prescribed burning | Fuel loadings are uncharacteristically high as a result of suppression efforts and insect and disease- caused conifer mortality. Fuel loading in 2055 would make fire suppression more difficult, which directly affects the ability to protect life, resources, and property. Moderate to heavy fuel loading is expected to comprise the majority of the IRA. Lower fuel loading is predicted in the center of the IRA; however, the east and west boundaries are predicted to have moderate to heavy fuel loadings in 2055.<br>By 2055 the north half of the IRA, particularly the northeast corner, would be affected by crown fire should an ignition occur under the right conditions.<br>Roadless area ecosystem characteristics within the IRA would continue to depart from historical composition and structures, leading to uncharacteristic effects if | Under alternative 2, stands within the IRA with light fuel loads remain about the same after treatment. The biggest effect would be a decrease in the number of stands with heavy fuel loads. It is anticipated the majority of acres with heavy fuel loads would shift to moderate fuel loads following treatment.<br>The potential for sustained crown fire within the IRA would be minimized.<br>Treatments proposed under alternative 2 align with the roadless rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1). | The beneficial effects within the Nipple Butte IRA are similar to the effects described under alternative 2. Alternative 3 proposes additional mechanical treatments within the IRA, and combined with the proposed prescribed fuels treatments a slightly greater reduction in fuel loading and potential crown fire can be seen compared to alternative 2.<br>Treatments proposed under alternative 3 align with the Roadless Rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1). | Alternative 4 proposes no mechanical treatments in the Nipple Butte IRA. With the exception of the northeast corner of the IRA, no planned ignitions are prescribed either. Direct and indirect effects would be similar to those described in the no action alternative in untreated stands within the IRA. If timing and weather allowed, management of unplanned ignitions would potentially reduce fuel loading and crown fire potential in the IRA. With the absence of mechanical treatments and relying solely on unplanned ignitions to manage fuels in the IRA, fuel and vegetation conditions would likely continue their departure from historical conditions and eventually succumb to the effects of wildfire, insects and disease. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | a wildfire were to occur during high or extreme fire danger. | | | |
| Effects of hiking/bicycle trails | The no action alternative would perpetuate existing conditions. Seasonal usage patterns and levels would remain the same.<br>Attractive mountain biking opportunities would continue to be nonexistent. | Trail developments would significantly increase the hiking and bicycling opportunities. There would be a moderate distance of new trail (19.4 miles) built within the Nipple Butte IRA. | Trail developments would be extensive and would very significantly increase the hiking and bicycling opportunities. This alternative would have the greatest distance of new trail mileage (32.7 miles) within the Nipple Butte IRA. | Trail developments would somewhat improve the hiking and bicycling opportunities. There would be only a very small distance of new trail (7.6 miles) within the Nipple Butte Inventoried Roadless Area (IRA). |
| Impacts to forage/wildlife | Upland shrub enhancement (conifer removal) treatments would not occur under this alternative and mahogany/bitterbrush communities would continue to be encroached and could ultimately be lost in the long-term. These communities provide critical quality browse and hiding cover for big game species. Allowing these upland shrub areas to continue to be overtopped and diminished could result in a substantial loss of quality habitat for elk and mule deer. | Following the completion of implementation of vegetation treatments (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Forage would increase under all alternatives.<br>Upland shrub enhancement would be expected to improve big game habitat vastly on 3,865 acres in the IRA, the majority of which would occur in the Wildlife | Following the completion of implementation of vegetation treatments (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Forage would increase under all alternatives.<br>Upland shrub enhancement would be expected to improve big game habitat vastly on 3,865 acres in the IRA, the majority of which would occur in the WEA. | The vegetation treatments proposed in alternative 4 would have similar beneficial effects to elk habitat, however not as evident compared to alternatives 2 and 3. The lack of upland shrub enhancement (conifer removal) treatments in the Nipple Butte WEA is noticeable under alternative 4 as habitat effectiveness index values actually decrease. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | | Emphasis Area (WEA). | | |
| **Fire, Fuels, and Air Quality** | | | | |
| Fire hazard | An increased potential for uncharacteristic crown fire behavior with greater resistance to control. | Canopy, ladder, and surface fuels would be reduced, which would contribute to successful fire suppression and protection of life and property under most fire scenarios. The continuity of the fuels within the project planning area would be broken up. | Alternative 3 would have a greater reduction of canopy fuels, ladder fuels, and surface fuels, than alternative 2, which would contribute to successful fire suppression and protection of life and property under most fire scenarios. The continuity of the fuels within the project planning area would be even more discontinuous than alternative 2. | Alternative 4 would have less reduction of canopy fuels, ladder fuels, and surface fuels, than alternative 2, which would contribute to more difficult fire suppression and protection of life and property under most fire scenarios. The continuity of fuels within the project planning area would be more continuous than alternative 2 increasing the potential for a fire to resist control. |
| Fuel loadings | An increase in the potential for stand replacing fires rather than the low-intensity/low-severity fires that would have occurred historically. Surface fuels including downed-woody material, needle litter, and duff accumulation would increase from current levels, contributing to the potential for stand-replacing fire and increased mortality.<br>In 40 years, approximately 24% of the project planning area would be | There would be a short-term increase in fire hazard following treatment and prior to slash disposal when fuels remain in the units and on the ground. Existing surface fuels and created slash would be treated by one or a combination of methods.<br>In 40 years following the proposed treatments, approximately 60% of the project planning area would be classified as having a light fuel load. | The additional acres of mechanical treatment proposed in alternative 3 would result in an even greater reduction in fuel loadings than alternative 2.<br>In 40 years following the proposed treatments, approximately 68% of the project planning area would be classified as having a light fuel load. | The reduction in acres of mechanical treatment proposed in alternative 4 would result in less reduction of fuel loading than alternative 2.<br>In 40 years following the proposed treatments, approximately 40% of the project planning area would be classified as having a light fuel load. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | classified as having a light fuel load. | | | |
| Crown fire potential | In 40 years, approximately 26% of the project planning area would have the potential for active/conditional crown fire. | In 40 years, approximately 12% of the project planning area would have the potential for active/conditional crown fire. | The additional acres of mechanical treatment proposed in alternative 3 would result in a slightly greater reduction in crown fire potential compared to alternative 2.<br>In 40 years, approximately 10% of the project planning area would have the potential for active/conditional crown fire. | The result of treating fewer acres in alternative 4 would be an increase in potential active/conditional crown fire in the planning area compared to alternative 2.<br>In 40 years, approximately 21% of the project planning area would have the potential for active/conditional crown fire. |
| Fire regime | Fires would be mixed severity to stand replacing with detrimental effects to other resources, which did not historically occur. | After completion of all mechanical treatment and prescribed burning these stands would begin to resemble a more historical forest structure and pattern.<br>Treatments would result in conditions that are more resilient to natural disturbance processes, including wildfire. | Alternative 3 treatments would change vegetation characteristics including stand density, species composition, and structural stage. With the additional acres being treated the beneficial effects in vegetation characteristics and fuel loadings would be greater than alternative 2.<br>Treatments identified in alternative 3 would result in more acres moving towards conditions that are more resilient to natural disturbance processes, including wildfire, than alternative 2. | Alternative 4 treatments would have less effect on vegetation characteristics including stand density, species composition, and structural stage. With the reduction in acres being treated the beneficial effects on vegetation characteristics and fuel loadings would be less than alternative 2.<br>Treatments identified in alternative 4 would result in less acres moving towards conditions that are more resilient to natural disturbance processes, including wildfire, than alternative 2. |
| Air quality standards | Wildfires tend to occur at the driest time of the year; therefore, fuels are more | Burning would follow the guidance provided by the Oregon Smoke | The additional mechanical treatments proposed in alternative 3 would result in | Treating fewer acres in alternative 4 would have the least amount of immediate |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | completely consumed and typically produce 3 to 5 times more emissions than early- or late-season prescribed fires<br>There is potential during a wildfire for approximately 440 pounds per acre of PM2.5 emissions. These smoke concentrations can have high particulate levels that may cause health problems or violate summertime Class I air quality visibility standards for wilderness areas. | Management Plan. There would be short-term effects to communities and residences downwind and in drainages adjacent to prescribed fire. There would also be short-term effects along Highway 395 north, County roads 18 and 32, and local Forest roads in the project planning area. All prescribed burning would comply with applicable federal, state, and local air quality regulations. | more machine and handpiles than alternative 2. This would have the potential to produce more smoke emissions from pile burning activities than alternative 2. All smoke management practices would be followed as described in alternative 2. | effect on air quality from prescribed burning. There would be fewer emissions from planned ignitions and pile burning. All smoke management practices would be followed as described in alternative 2. |
| **Soils** | | | | |
| Detrimental soil conditions (number of units that violate Malheur Forest Plan standards) | No direct or indirect detrimental soil impacts. Root action, animals that burrow in the soil, and freezing water would gradually continue to loosen compacted and puddled soil over the course of decades. | Increases in detrimental conditions from heavy equipment use would range from 4 to 11% in the various units, resulting in cumulative detrimental conditions of 17 percent or less. Eleven units would require special design criteria to meet the Malheur Forest Plan standards. The Forest Plan standards would be met under all alternatives. | | |
| Organic matter and nutrients (difference from levels before Euro-American settlement) | Forest floor organic matter and nutrients would continue to accumulate. | Logging would remove nutrients and organic matter in logs, and fuel reduction treatments would remove nutrients and forest floor organic matter during burning and biomass utilization. Removal may decrease site productivity a few percent on some sites. However, on many or most sites, productivity is likely limited by water, not by nutrients or forest floor organic matter. In addition, removal of nutrients would be limited because most nutrients on the site would remain in the soil, in the remaining forest floor, and in remaining trees. | | |
| **Watershed** | | | | |
| Acres of ground disturbing harvest | 0 acres | 4,545 acres of harvest units (3,331 acres in the East Fork Beech Creek | 7,187 acres of harvest units (5,477 acres in the East Fork Beech Creek subwatershed | 3,590 acres of harvest units (2,425 acres of harvest in the East Fork Beech Creek |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | subwatershed and 1,214 acres in the Grub Creek subwatershed). | and 1,910 acres in the Grub Creek subwatershed). | subwatershed and 1,165 acres in the Grub Creek subwatershed). |
| Qualitative rating of watershed hazard (very low to very high) | No additional disturbance would occur. The watershed hazard would remain the same as the existing condition for the short-term. The condition of riparian roads would continue to limit stream channel recovery. Over the long-term watershed hazard would generally decrease as recovery from past activities continues, although localized areas of active erosion would continue as chronic, localized hazards. | Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events. Trails would intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase to **Medium High at year 1 and gradually, over several decades, decline to Medium plus**, because the trails would still be present on non-forested soils. | Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events. Trails would intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase to **Medium High (plus) at year 1**, because of the increase in yarding and new trail construction compared to alternative 2 **and gradually, over several decades, decline to Medium plus-plus**, because the additional trails, some of which are on non-forested soils would remain. | Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events. Trails would intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase **to Medium High (minus) at year 1**, because of the increase in yarding and new trail construction compared to alternative 2 **and gradually, over several decades, decline to Medium (minus)**, because fewer additional trails, some of which are on non-forested soils would |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | | | remain. |
| **Aquatic Species** | | | | |
| Pool frequency | Would maintain the current levels of pool habitat, which are below objectives for streams in the analysis area and limit important habitat for salmonids, especially for rearing juveniles and adults migrating prior to spawning | *Timber felling* – Negative, not meaningfully measured (NNMM) short-term, Positive, not meaningfully measured (PNMM) long-term | *Timber felling* – NNMM | *Timber felling* – NNMM |
| | | *Fuels treatments* – NNMM | *Fuels treatments* – NNMM | *Fuels treatments* – NNMM short-term, PNMM long-term |
| | | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM |
| | | *Stream crossing* – NNMM | *Stream crossing* – NNMM | *Stream crossing* – NNMM |
| | | *Stream crossing improvements* – NNMM | *Stream crossing improvements* – NNMM short-term, PNMM long-term | *Stream crossing improvements* – NNMM short-term, PNMM long-term |
| | | *Road decommissioning and closure* – NNMM short-term, Positive, meaningfully measured (PMM) long-term | *Road decommissioning and closure* – NNMM short-term, PMM long-term | *Road decommissioning and closure* – NNMM short-term, PMM long-term |
| | | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM |
| | | *Magone Lake aquatic actions* – N/A | *Magone Lake aquatic actions* – N/A | *Magone Lake aquatic actions* – N/A |
| | | *Recreation trails* – Neutral | *Recreation trails* – NNMM | *Recreation trails* – Neutral |
| | | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A |
| Water temperature and stream shading | Would maintain the current levels of stream | *Timber felling* – NNMM | *Timber felling* – NNMM | *Timber felling* – NNMM short-term, PNMM long-term |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | shading, with perhaps a slow increase as trees in previously logged riparian areas continue to grow at a retarded rate due to overstocked stands.<br>Current water temperatures in nearly all streams in the analysis area exceed or are at maximum threshold objectives for water temperature. Mean maximum water temperatures are at the maximum threshold range for westslope cutthroat trout, redband trout, and juvenile steelhead that are all present in the aquatic analysis area during the summer months. | *Fuels treatments* – NNMM short-term, PNMM long-term | *Fuels treatments* – NNMM short-term, PMM, long-term | *Fuels treatments* – NNMM short-term, PNMM long-term |
| | | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM |
| | | *Stream crossing* – NNMM | *Stream crossing* – NNMM | *Stream crossing* – NNMM |
| | | *Stream crossing improvements* – NNMM short-term, PNMM long-term | *Stream crossing improvements* – NNMM short-term, PNMM long-term | *Stream crossing improvements* – NNMM |
| | | *Road decommissioning and closure* – NNMM short-term, PMM long-term | *Road decommissioning and closure* – NNMM short-term, PMM long-term | *Road decommissioning and closure* – PMM |
| | | *Road maintenance and use* – NNMM short-term, PNMM long-term | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM |
| | | *Magone Lake aquatic actions* – PNMM | *Magone Lake aquatic actions* – Neutral | *Magone Lake aquatic actions* – PNMM |
| | | *Recreation trails* – NNMM | *Recreation trails* – NNMM | *Recreation trails* – Neutral |
| | | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A |
| Large woody debris | Would maintain current levels of large woody debris (LWD). Current levels of LWD are below objectives for all streams in the project planning area and is resulting in degraded stream conditions including low pool frequencies. | *Timber felling* – NNMM short-term, PNMM long-term | *Timber felling* – NNMM | *Timber felling* – NNMM short-term, PNMM long-term |
| | | *Fuels treatments* – NNMM short-term, PMM long-term | *Fuels treatments* – NNMM short-term, PMM long-term | *Fuels treatments* – NNMM short-term, PNMM long-term |
| | | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NNMM |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | Replacement LWD would be recruited into properly functioning stream channels as conifers die and fall into streams, stream scour undermines root systems, and from windfall or slide events. | *Stream crossing* – NNMM short-term, PNMM long-term | *Stream crossing* – NNMM short-term, PNMM long-term | *Stream crossing* – NNMM |
| | | *Stream crossing improvements* – NNMM short-term, PNMM long-term | *Stream crossing improvements* – PNMM | *Stream crossing improvements* – PNMM |
| | | *Road decommissioning and closure* – PMM short-term, PNMM long-term | *Road decommissioning and closure* – PMM | *Road decommissioning and closure* – PMM |
| | | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM |
| | | *Magone Lake aquatic actions* – PMM | *Magone Lake aquatic actions* – PMM | *Magone Lake aquatic actions* – PMM |
| | | *Recreation trails* – NNMM | *Recreation trails* – Neutral | *Recreation trails* – Neutral |
| | | *Recreation (boats and fishing docks)* – N/A Mid-Columbia River steelhead critical habitat (threatened); NE rainbow trout, redband trout (sensitive), Westslope cutthroat trout (sensitive), brook trout, and Columbia spotted frog (sensitive). Installation and improvements for boats and fishing docks would not require the removal of any large trees that could potentially be large woody debris within Magone Lake | *Recreation (boats and fishing docks)* – N/A Mid-Columbia River steelhead critical habitat (threatened); NE rainbow trout, redband trout (sensitive), Westslope cutthroat trout (sensitive), brook trout, and Columbia spotted frog (sensitive). Installation and improvements for boats and fishing docks would not require the removal of any large trees that could potentially be large woody debris within Magone Lake | *Recreation (boats and fishing docks)* – N/A Mid-Columbia River steelhead critical habitat (threatened); NE rainbow trout, redband trout (sensitive), Westslope cutthroat trout (sensitive), brook trout, and Columbia spotted frog (sensitive). Installation and improvements for boats and fishing docks would not require the removal of any large trees that could potentially be large woody debris within Magone Lake |
| Embeddedness and fine sediment | Would maintain the | *Timber felling* – NNMM | *Timber felling* – NNMM | *Timber felling* – NNMM |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | current levels of fine sediment and embeddedness over much of the analysis area. Existing fine sediment levels are likely having adverse impacts to aquatic habitat. These adverse effects include reduced spawning success for salmonids and reduced quality of rearing habitat for juvenile salmonids. Fine sediment levels in the streams discussed above would slowly decrease as channels stabilize from past grazing and road building. However, native surface roads that are contributing fine sediment would stay in their current condition. | *Fuels treatments* – NNMM short-term, PMM long-term | *Fuels treatments* – NNMM short-term, PMM long-term | *Fuels treatments* – NNMM short-term, PNMM long-term |
| | | *Temporary road and landing construction* – NNMM | *Temporary road and landing construction* – NMM | *Temporary road and landing construction* – NNMM |
| | | *Stream crossing* – NNMM | *Stream crossing* – NNMM | *Stream crossing* – NNMM |
| | | *Stream crossing improvements* – NNMM | *Stream crossing improvements* – NNMM short-term, PMM long-term | *Stream crossing improvements* – NNMM short-term, PMM long-term |
| | | *Road decommissioning and closure* – Negative, meaningfully measured (NMM) short-term, PMM long-term | *Road decommissioning and closure* – NMM short-term, PMM long-term | *Road decommissioning and closure* – NMM short-term, PMM long-term |
| | | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM | *Road maintenance and use* – NNMM |
| | | *Magone Lake aquatic actions* – NNMM | *Magone Lake aquatic actions* – NNMM | *Magone Lake aquatic actions* – NNMM |
| | | *Recreation trails* – NNMM | *Recreation trails* – NMM | *Recreation trails* – NNMM |
| | | *Recreation (boats and fishing docks)* – NNMM-PNMM<br>Sediment may be generated from compaction and equipment related activities for improvements and installation of boats and fishing docks. Utilization of BMPs and erosion fabric would minimize the amount so that it is not | *Recreation (boats and fishing docks)* – NNMM-PNMM<br>Sediment may be generated from compaction and equipment related activities for improvements and installation of boats and fishing docks. Utilization of BMPs and erosion fabric would minimize the amount so that it is not meaningfully measurable.<br>Reducing shoreline vegetation trampling by recreationists for boating and fishing | *Recreation (boats and fishing docks)* – NNMM-PNMM<br>Sediment may be generated from compaction and equipment related activities for improvements and installation of boats and fishing docks. Utilization of BMPs and erosion fabric would minimize the amount so that it is not meaningfully measurable.<br>Reducing shoreline |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | meaningfully measurable. Reducing shoreline vegetation trampling by recreationists for boating and fishing opportunities. Pulling boats up onto the shoreline would be minimized reducing shoreline disturbance. | opportunities. Pulling boats up onto the shoreline would be minimized reducing shoreline disturbance. | vegetation trampling by recreationists for boating and fishing opportunities. Pulling boats up onto the shoreline would be minimized reducing shoreline disturbance. |
| Width-to-depth ratio | Would maintain the current width-to-depth ratios over much of the analysis area. Width-to-depth ratios are higher than objectives for 26 reaches of the 28 surveyed stream reaches in the analysis area and are likely having adverse effects to aquatic habitat, primarily through altered sediment routing and elevated water temperatures. Adjacent roads are influencing the channel morphology of several of these streams by conveying water off adjoining hillslopes at elevated rates and altering sediment transport through modification of tributary alluvial fans. | *Timber felling* – Neutral | *Timber felling* – Neutral | *Timber felling* – Neutral |
| | | *Fuels treatments* – Neutral | *Fuels treatments* – Neutral | *Fuels treatments* – Neutral |
| | | *Temporary road and landing construction* – Neutral | *Temporary road and landing construction* – Neutral | *Temporary road and landing construction* – Neutral |
| | | *Stream crossing* – Neutral | *Stream crossing* – Neutral | *Stream crossing* – Neutral |
| | | *Stream crossing improvements* – Neutral | *Stream crossing improvements* – PNMM | *Stream crossing improvements* – Neutral |
| | | *Road decommissioning and closure* – Neutral | *Road decommissioning and closure* – PMM | *Road decommissioning and closure* – PMM |
| | | *Road maintenance and use* – Neutral | *Road maintenance and use* – Neutral | *Road maintenance and use* – Neutral |
| | | *Magone Lake aquatic actions* – N/A | *Magone Lake aquatic actions* – N/A | *Magone Lake aquatic actions* – N/A |
| | | *Recreation trails* – Neutral | *Recreation trails* – Neutral | *Recreation trails* – Neutral |
| | | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A | *Recreation (boats and fishing docks)* – N/A |
| Streambank stability | Would maintain the current levels of bank stability. Bank stability is | *Timber felling* – NNMM | *Timber felling* – Neutral | *Timber felling* – NNMM |
| | | *Fuels treatments* – NNMM short-term, PNMM long- | *Fuels treatments* – NNMM short-term, PMM long-term | *Fuels treatments* – PMM |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | generally high in the analysis area with the exception of specific locations where bank instability is occurring due to altered hydrological processes. | term | | |
| | | *Temporary road and landing construction* – Neutral | *Temporary road and landing construction* – Neutral | *Temporary road and landing construction* – Neutral |
| | | *Stream crossing* – NNMM | *Stream crossing* – NNMM | *Stream crossing* – Neutral |
| | | *Stream crossing improvements* – NNMM short-term, PNMM long-term | *Stream crossing improvements* – PNMM | *Stream crossing improvements* – PNMM |
| | | *Road decommissioning and closure* – NMM short-term, PMM long-term | *Road decommissioning and closure* – NNMM short-term, PMM long-term | *Road decommissioning and closure* – NNMM short-term, PMM long-term |
| | | *Road maintenance and use* – Neutral | *Road maintenance and use* – Neutral | *Road maintenance and use* – Neutral |
| | | *Magone Lake aquatic actions* – NNMM | *Magone Lake aquatic actions* – NNMM | *Magone Lake aquatic actions* – NNMM |
| | | *Recreation trails* – NNMM | *Recreation trails* – NMM | *Recreation trails* – NNMM |
| | | *Recreation (boats and fishing docks)* – NNMM short-term, PNMM long-term<br>Shoreline stability immediately adjacent to the boat dock improvements and fishing dock may result in short-term bank instability within the immediate vicinity of the connection of the docks with land. However, hardening of the connection point and adherence to BMPs would not result in a | *Recreation (boats and fishing docks)* – NNMM short-term, PNMM long-term<br>Shoreline stability immediately adjacent to the boat docks improvements and fishing dock may result in short-term bank instability within the immediate vicinity of the connection of the docks with land. However, hardening of the connection point and adherence to BMPs would not result in a meaningfully measurable loss of shoreline stability.<br>The reduction in boats being pulled up onto the shoreline | *Recreation (boats and fishing docks)* – NNMM short-term, PNMM long-term<br>Shoreline stability immediately adjacent to the boat docks improvements and fishing dock may result in short term bank instability within the immediate vicinity of the connection of the docks with land. However, hardening of the connection point and adherence to BMP's would not result in a meaningfully measurable loss of shoreline stability.<br>The reduction in boats being |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | meaningfully measurable loss of shoreline stability.<br>The reduction in boats being pulled up onto the shoreline and reduction in shoreline foot traffic would result in a positive but not meaningfully measurable effect to shoreline bank stability. | and reduction in shoreline foot traffic would result in a positive but not meaningfully measurable effect to shoreline bank stability. | pulled up onto the shoreline and reduction in shoreline foot traffic would result in a positive but not meaningfully measurable effect to shoreline bank stability. |
| Mid-Columbia River steelhead effects determinations (federally threatened, Sensitive species from Regional Forester's list, and Malheur Forest Plan management indicator species) | **No Effect** | **May Effect, Likely to Adversely Affect** short-term; **Beneficial Effect** long-term.<br>**May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** short-term; **Beneficial Impact** long-term.<br>Short-term adverse effects related to sediment contribution for recreational trail crossing construction and road improvement work is expected for all alternatives however with implementation of PDCs within the Malheur National Forest Aquatic Restoration Decision, ARBO II for livestock crossings, and implementation of Malheur National Forest stream crossing PDCs these effects are expected to be short-term. Road crossing improvements would result in a long-term reduction in fine sediment contribution from road prism. The placement of large substrate and hardened entry points for recreational trail crossings would alleviate the potential for bank erosion and fine sediment contribution related to livestock trailing along recreational trails (will not cross bridges (see Tables 77, 85, and 93; Aquatic Analysis Issues Chapter 3)).<br>Temporary road construction within alternative 2 does not occur within Mid-Columbia River Steelhead Critical Habitat, However in alternative 3 temporary road construction does occur within Mid-Columbia River Steelhead Critical Habitat and would adversely effect Mid-Columbia River steelhead due to its direct connection with the stream corridor and located <100 feet from the stream for sediment. Alternative 4 does not include any temporary road construction within Mid-Columbia River Steelhead Critical Habitat.<br>The effects described above increase in extent and magnitude based on the increase in the number of trail crossings and road improvements between alternatives 2 and 3 and decrease in alternative 4.<br>Foreseeable aquatic restoration actions would also have a short-term adverse effect as described within the Malheur Nationa Forest Aquatic Restoration Decision and ARBO II but result in long-term benefits/improvement for the indicators of large woody debris, pool | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | frequency, width to depth ratio, and fine sediment (see Table 94; Aquatic Analysis Issues Chapter 3).<br>Fine sediment can smother Mid-Columbia River steelhead redds (eggs) within the gravel interstitial spaces, and fill pools critical for juvenile rearing especially within smaller 1st order streams. | | |
| Mid-Columbia River steelhead designated critical habitat | **No Effect** | **May Effect, Likely to Adversely Affect** short-term; **Beneficial Effect** long-term<br>(See rationale above) | | |
| Interior redband trout effects determinations (Sensitive species from Regional Forester's list and Malheur Forest Plan management indicator species) | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** short-term; **Beneficial Impact** long-term<br>Because Interior redband trout distribution overlaps Mid-Columbia River Steelhead Critical Habitat the effects from the proposed actions described for Mid-Columbia River Steelhead would be similar to Interior Redband trout and therefore are not expected to contribute to trend towards federal listing or cause a loss of viability to the population or species. A long-term beneficial impact related to restoration of those processes that create quality habitat and provide for perennial flow is expected. | | |
| Westslope cutthroat trout effects determinations (Sensitive species from Regional Forester's list and Malheur Forest Plan management indicator species) | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** short-term; **Beneficial Impact** long-term<br>Because Westslope cutthroat trout distribution overlaps Mid-Columbia River Steelhead Critical Habitat the effects from the proposed actions described for Mid-Columbia River Steelhead would be similar to Westslope cutthroat trout and therefore not expected to contribute to trend towards federal listing or cause a loss of viability to the population or species. A long-term beneficial impact related to restoration of those processes that create quality habitat and provide for perennial flow is expected. | | |
| Columbia spotted frog effects determinations (Sensitive species from Regional Forester's list) | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** short-term; **Beneficial Impact** long-term<br>Because of temporary road construction and new recreation trail construction/crossings individuals associated with wetland features and perennial waters may be displaced in the short-term and localized habitat impacted. However, these localized effects are not expected to contribute to trend towards federal listing or cause a loss of viability to the population or species. Foreseeable aquatic restoration action and those actions within Magone Lake are expected to improve habitat for Columbia spotted frog within the project planning area. | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | Because road decommissioning/culvert replacement under the forseeable aquatic restoration actions may result in removal of undersized culverts which function in creating upstream ponds some habitat may be removed and individual frogs displaced. However, long-term benefits related to water storage and sediment transport are expected to result in an overall increase in the available habita for these individuals. | | |
| **Wildlife – Proposed, Endangered, Threatened, and Sensitive Species** | | | | |
| Gray wolf (East of Hwy 395) | **No Impact** | **No Impact** because currently a no impact determination is recommended by Oregon Department of Fish and Wildlife for projects within the Malheur National Forest (east of Hwy 395). Additionally, gray wolves are highly adaptable; therefore, management activities would be expected to have little effect on habitat use. | | |
| Pallid bat, Townsend's big-eared bat, and fringed myotis | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** because: there could be a degree of displacement or disturbance for bat species during project implementation; some live and dead trees providing habitat may be removed; enhancing foraging areas could benefit these species; and treatment could potentially change how affected habitat would be used by bat species. | | |
| Bufflehead | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** due to displacement from post-breeding habitat and potential loss of suitable nesting cavities. | | |
| American peregrine falcon | **No Impact** | **No Impact** because no activities are proposed in or adjacent to suitable nesting habitat under any alternative. Further, although potential nesting habitat exists in the project planning area, no nests or incidental observations have been documented. | | |
| Bald eagle | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** because implementation could result in the loss of snags.<br>In the long-term, treatments would help retain and promote growth and longevity of large trees and would have a **Beneficial Impact** on bald eagles. | | |
| Lewis's woodpecker | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** because implementation could result in the loss of snags. In addition, during project operations, a degree of disturbance and displacement of Lewis's woodpeckers would be possible.<br>In the long-term, treatments would help retain and promote growth and longevity of large trees and would have a **Beneficial Impact** on Lewis's woodpecker. | | |
| White-headed woodpecker | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards** | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | **Federal Listing or Cause a Loss of Viability to the Population or Species** because implementation could result in the loss of snags.<br>In the long-term, treatments would help retain and promote growth and longevity of large trees and increase in old forest single stratum, which would have a **Beneficial Impact** on white-headed woodpecker. | | |
| Johnson's hairstreak | **No Impact** | **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species** in the short-term because the harvest of mistletoe-infected trees would occur and heat and smoke from underburning could affect larvae and adult individuals. In the long-term, alternatives 2 and 3 and, to a lesser extent, alternative 4 would maintain healthy levels of large ponderosa pine and mistletoe and therefore have a **Beneficial Impact** on the Johnson's hairstreak. | | |
| Silver-bordered fritillary | **No Impact** | **No Impact** because the silver-bordered fritillary is not known to occur within the project planning area although habitat is present. Action alternatives would have negligible effects to moist and wet meadow habitat because of project design criteria. | | |
| **Wildlife – Management Indicator Species** | | | | |
| Lewis's woodpecker, red-naped sapsucker, Williamson's sapsucker, downy woodpecker, hairy woodpecker, black-backed woodpecker, pileated woodpecker, three-toed woodpecker, white-headed woodpecker, and northern flicker (representing dead and defective wood habitat for cavity excavation birds) | The no action alternative would not affect dead and defective wood habitat and therefore would not contribute to a negative trend in viability for MIS dead and defective wood habitat dependent species, such as primary cavity excavators, on the Malheur National Forest. | Under all action alternatives**, a slight decrease in forest-wide dead, down, and defective habitat or population trends for primary cavity excavators would be expected as a result of implementation in the short-term**. In the mid- to long-term, habitat would be expected to recover and improve and conditions would better mimic the historical range of variability. However, due to the more extensive trail system, less area designated as connectivity, and substantially more acres and units treated, alternative 3 would have a greater effect on dead and defective habitat. All alternatives would provide more resilient stands leading to larger, older age class trees eventually becoming decadent and producing higher quality dead and defective habitat. Therefore, no forest-wide threats to any primary cavity excavator's population viability would be expected from implementation of the action alternatives in this project planning area. However, implementing alternative 3 would result in the project planning area likely being highly departed from historical snag levels. | | |
| Black-backed woodpecker | In the short-term, alternative 1 may benefit black-backed woodpecker as a result of higher likelihood of bug kill and fire mortality. In the long-term, large-scale events within the project planning area may render the area | All of the action alternatives would impact suitable black-backed woodpecker habitat in the project planning area. However, the highest level of activities proposed under alternative 3 would impact less than 2% of suitable habitat at the Forest-level, and current conditions greatly exceed the historical range of variability for black-backed woodpeckers. The overall direct, indirect, and cumulative effects would result in a small negative trend of habitat. The loss of habitat would be insignificant at the scale of the Forest. Further, wildfire events are possible, or likely, at the Forest-level, which could create more suitable habitat and partially mitigate any negative effects of the project. The Magone Project is consistent with the Malheur Forest Plan, and thus continued viability of the black-backed woodpecker is | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | unsuitable until future snags develop. Alternative 1 would not contribute to a negative trend in viability on the Malheur National Forest for black-backed woodpeckers. | expected on the Malheur National Forest. | | |
| Rocky Mountain elk (representing species commonly hunted) | Elk habitat would remain the same in the short-term. In the mid- to long-term, forage would likely decrease as a result of increasing cover, and critical habitats such as upland shrub areas and aspen could be degraded and eventually lost. However, because of their high mobility, extensive distribution, and the ability of elk and other big game species to find and use a variety of suitable habitats, there would be no negative trend in viability on the Malheur National Forest for Rocky Mountain elk. | Although each action alternative would likely enhance elk habitat, alternative 3 would have the most detrimental effects to elk because of the smaller proportion of landscape proposed for connectivity and the extensive recreation trails and their associated effects. Trails proposed under alternative 2 could also have notable effects on elk distribution but would still provide areas of quality security.<br>The Northside Game Management Unit, which contains all of Magone project planning area, is approximately 700 elk over the management objective of 2,000 elk. Adjacent Desolation and Murderer's Creek Game Management Units are also above management objectives. Therefore, although alternative 3 would have the highest level of effects to elk and big game, there would not be a viability concern for the species on the Blue Mountain Ranger District or Malheur National Forest under any action alternative. | | |
| Old growth network | Under alternative 1, there would be no changes to the MA-13 network. No replacement old growth areas (ROGs) would be designated, no late and old structure (LOS) stands would be treated, and no connectivity corridors | All action alternatives propose to alter the location and/or stand boundaries of dedicated old growth (DOG) areas in order to expand the current MA-13 network to include replacement old growth (ROG) and pileated woodpecker feeding areas (PWFAs) to meet Malheur Forest Plan standards. Ultimately, there would be net loss of approximately 312 acres of dedicated old growth, but an overall expansion of approximately 1,067 acres of the MA-13 network including DOGs and ROGs/PWFAs.<br>Connectivity corridors were designed during project planning and are proposed under each action alternative to serve as connectivity between late and old (LOS) structured stands to allow for movement of old growth species and big game. The goal of creating "connectivity" | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | would be designated. Malheur Forest Plan standards regarding the MA-13 network would not be met. No change from the existing condition would be expected. | is to manage stands in corridors at higher canopy densities when compared to more intensively managed stands located outside of corridors. Corridors established for old growth species in the project planning area would allow for big game migratory and dispersal movements, as well as providing higher cover rates and forage. Magone connectivity corridors would link LOS stands, including DOG, ROG, and associated old growth areas to LOS areas throughout the project planning area, including those within Nipple Butte Inventoried Roadless Area (IRA) and Nipple Butte Wildlife Emphasis Area. The Nipple Butte Wildlife Emphasis Area is entirely with the IRA. The designated connectivity corridor is approximately 9,066 acres in alternatives 2 and 4, and about 6,740 acres in alternative 3 (approximately 34% and 25% of the project planning area, respectively), including proposed acreages from DOGs, ROGs, pileated woodpecker feeding areas (PWFAs) and areas that will be treated but left denser specifically for connectivity and big game security. Not including the MA-13 areas, the proposed connectivity would be approximately 6,218 acres in alternatives 2 and 4, and approximately 3,892 acres in alternative 3. | | |
| Pileated woodpecker, American (pine) marten, and three-toed woodpecker, (representing old-growth dependent species) | Alternative 1 would not affect pileated woodpecker, American (pine) marten, or three-toed woodpecker habitat and therefore would not contribute to a negative trend in viability on the Malheur National Forest for these species. | Due to the expected shifts in forest structure, expansion of MA-13 network, extensive connectivity, and treatment of a fraction of forest-wide habitat, the overall direct and indirect effects could result in a small negative trend of habitat in the short- to mid-term. Any loss or shift of habitat would be negligible at the scale of the Forest. However, old forest multi-strata habitat would remain within or above the historical range of variability in the short- and long-term under each action alternative. Therefore, population viability for pileated woodpecker is expected on the Malheur National Forest under each action alternative.<br>Although alternatives 2 and 3 could have considerable effects to pine marten individuals and habitat from the proposed trail systems, potential prescribed fall burning and silvicultural treatments in secondary habitat, continued viability of the pine marten is expected on the Malheur National Forest under all action alternatives.<br>Because of the small amount of secondary habitat, small amounts of Cool Moist habitat and Cold Dry lodgepole habitat, the location of suitable secondary habitat, and the expansion of the MA-13 network and designation of extensive connectivity corridors under all action alternatives, it is not expected the Magone Project would result in any viability concerns to three-toed woodpeckers. | | |
| **Wildlife – Featured Species** | | | | |
| Northern goshawk | Alternative 1 would maintain the suitability of all existing habitat. Additionally, this | Although treatments are proposed within reproductive habitat and post-fledging areas (PFAs), no treatment would occur within known nest stands. For all action alternatives, habitat would remain above the historical range of variability (HRV) for old forest multi strata and approach HRV for old forest single stratum. Over time, stand complexity is expected to | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | alternative would not result in displacement of goshawks. | improve and may in the long-term result in habitat that is higher in quality than what may develop in some untreated stands.<br>There would be an adequate amount of nesting habitat available to goshawks displaced from nest stands and PFAs as a result of increased recreation along proposed bike trails in alternatives 2 and 3. There could be increased nest abandonment and failure, which could lead to decreased recruitment in the short-term. However, no loss of individuals would be expected from project activities under any action alternatives. In the mid- to long-term, goshawks would acclimate to the increased presence of humans or move to other suitable nesting habitat within or outside the project planning area. Therefore, no effects to goshawk viability would be expected from the implementation of any of the action alternatives. | | |
| Blue (dusky) grouse | Under alternative 1, no management activities proposed for the Magone Project would occur. Habitat conditions would remain unchanged in the short- and mid-term. Over the long-term, increased stand densities and related stress would result in a greater incidence of insects and disease in the project planning area. | All action alternatives contain project design criteria that follow Regional Forester's Eastside Forest Plan Amendment 2 standards for retaining grouse winter roost habitat. Action alternatives may affect grouse habitat, however, habitat would remain above the historical range of variability and no adverse effects would be expected to blue grouse habitat or populations from implementation of any of the action alternatives. | | |
| Osprey | Due to the highly migratory nature of osprey and limited foraging opportunities in the project planning area, direct and indirect adverse effects to osprey or their existing habitat are not anticipated from alternative 1. | Nesting and foraging habitat within the project planning area is limited, and therefore there are no impacts expected to osprey that would result in a change in the number of individuals, populations or prey species as a result of any of the action alternatives. | | |
| **Wildlife – Landbirds, Including Neotropical Migratory Birds** | | | | |
| Bald eagle | See Wildlife – Proposed, Endangered, Threatened, and Sensitive Species section. | | | |
| Flammulated owl | Continued decline of open forest and early seral | Increase in grassy openings from commercial thinning and prescribed burning, but likely reduction of dense thickets from non-commercial thinning. Although suitable habitat remains | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | species. | below historical range of variability, there would be an increase under all action alternatives. | | |
| Calliope hummingbird | Continued decline of habitat as result of increased stand densities. | Forest gaps would increase open shrub sapling stages on 5 to 20% of treated areas and across 5,500 acres of upland shrub enhancement treatments in alternatives 2 and 3, and 1,685 acres in alternative 4. | | |
| Lewis's woodpecker | See Wildlife – Proposed, Endangered, Threatened, and Sensitive Species section. | | | |
| Williamson's sapsucker | See Wildlife – Proposed, Endangered, Threatened, and Sensitive Species section. | | | |
| White-headed woodpecker | See Wildlife – Proposed, Endangered, Threatened, and Sensitive Species section. | | | |
| Olive-sided flycatcher | Suitable habitat condition would continue to be limited until suppression mortality created gaps and edge habitat. | Thinning would create more open stand conditions and accelerate growth of larger trees that may become snags. Forest gaps would increase understory growth, contributing to increased insect production over the next 20 years. Increased forest edge habitat would also enhance foraging opportunities. Gaps created by thinning may allow foraging until the canopy eventually closes again and these opportunities are lost. Upland shrub enhancement treatments would create optimum foraging areas. | | |
| Willow flycatcher | Continued decline of riparian habitats. Stream channels will remain gullied. Riparian vegetation will be further departed from historic conditions. | Hardwood treatments are designed to enhance hardwood species such as aspen, willow, alder, and cottonwood. | | |
| Cassin's finch | Continued risk of loss of habitat due to uncharacteristic wildfire. | Warm Dry late and old structure would be moved from old forest multi strata to old forest single stratum post-treatment. Increased habitat suitability from aspen stand enhancement and thinning of young trees and upland shrub enhancement treatments. | | |
| **Botanical Resources** | | | | |
| Federally listed, proposed, and candidate plant species | No Impact | There are no known populations, or potential habitat, for any federally listed or proposed plant species in the project planning area. White bark pine (*Pinus albicaulis*) is a candidate for federal listing. There is no potential habitat for this species in the Magone project planning area. Therefore, implementation of the action alternatives would have no effect to whitebark pine, or to any federally listed, proposed, or candidate plant species. | | |
| Known sensitive plant populations | No Impact | All known populations of sensitive plants would be buffered from all ground disturbing activities. Some populations may be subject to prescribed burning. However, the project design criteria prescribe that a botanist be consulted before burning occurs in areas with known sensitive plant populations. These protections should adequately ensure that there are no direct or indirect effects from project activities to known populations of sensitive | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | plants. Therefore, there would be **No Impact** to known populations of sensitive plants from project activities associated with the action alternatives. | | |
| Sensitive plant habitat types: coniferous forest communities | No Impact | None of the sensitive plant species that may occur in coniferous forest habitats on the Malheur National Forest is extremely rare on a global scale. Therefore, even if project activities may negatively affect individual plants or habitat, implementation of alternatives 2 and 3 should not increase the need for Federal listing of any sensitive species. For alternatives 2 and 3, the determination of effects for forested communities and any sensitive plants that may occur there is: **May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species.**<br>The potential for negative effects to coniferous forest communities may be slightly greater for alternative 3 than for alternative 2. This is mostly because more acres are proposed for vegetative treatment.<br>The potential for negative effects to coniferous forest communities may be slightly less for alternative 4 than for alternative 2. This is mostly because fewer acres are proposed for vegetative treatment. | | |
| Sensitive plant habitat types: aspen communities | No Impact | Although there may be detrimental potential effects to the habitat for the short-term due to ground disturbance, the long-term effects to these areas may actually be beneficial. This is due to the fact that the aspen would be stimulated to grow new stems, the competing conifers would be removed, and the stands may be protected from ungulate grazing. Because the aspen stands would be rejuvenated in the long-term, the action alternatives should have **Beneficial Impact** to sensitive plant species that occur within aspen stands. | | |
| Sensitive plant habitat types: lithosols, sagebrush shrublands, and grasslands | No Impact | Because the project design criteria would protect lithosol, sagebrush shrubland, and grassland habitats in the project planning area, implementation of the action alternatives should have **No Impact** to lithosols, sagebrush shrublands, and grassland habitats, or to any sensitive species that may occur. | | |
| Sensitive plant habitat types: cliffs, rock outcrops, and talus | No Impact | Because the project design criteria would protect cliffs, rock outcrops, and talus in the project planning area, the implementation of the action alternatives should have **No Impact** to cliffs, rock outcrops, and talus habitats, or to any sensitive species that may occur there. | | |
| Sensitive plant habitat types: riparian dependent communities | No Impact | None of the sensitive plant species that may occur in riparian dependent habitats is considered extremely rare on a global scale. Even if project activities may impact individual plants or habitat, implementation of this alternative should not increase the need for Federal listing of any sensitive species. Therefore, alternatives 2 and 3 **May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species** potentially found in riparian and | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
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| | | wetland habitats.<br>The potential for negative effects to riparian dependent communities may be slightly greater for alternative 3 than for alternative 2. This is mostly because more acres are proposed for vegetative treatment.<br>The potential for negative effects to riparian dependent communities may be slightly less for alternative 4 than for alternative 2. This is mostly because fewer acres are proposed for vegetative treatment. | | |
| Culturally significant plant species | No Impact | Since culturally significant plants are not tracked or mapped, it is difficult to assess the effects to these species from proposed activities. Many of these plants occur in unique habitats such as lithosols, wet meadows, or ephemerally wet areas. See the discussions above for a general description of potential impacts to the various habitat types. The project design criteria that protect these unique habitats would help to protect the long-term viability of these species. Treatments that would reduce the chances of high-intensity fire should help to prevent the death of plants from excess heat. Conversely, some species may actually be helped by the removal of competition and the nutrient flush that is associated with fire in the environment. | | |
| **Non-native Invasive Plants** | | | | |
| Risk of spread from ground disturbance | There would be no change to the existing rate of spread, nor a change in the introduction of new species from the current rate. | The action alternatives have the potential to increase the spread and introduction of non-native invasive plants during treatment. However, with the proper mitigation measures in place; continued diligence towards minimizing bare ground, eradicating new weed sites, minimizing potential weed sources such as unclean machinery, and reseeding when bare ground is created, the amount and extent of cumulative effects can remain minimal. With the proper mitigation the adverse effects would remain unmeasurable. | | |
| **Range** | | | | |
| Forage production | Decrease in forage production and quality from increased canopy closure. | Increase in available forage due to silviculture treatments and prescribed burning. | Greatest increase in available forage due to greatest amount of silviculture treatment and prescribed burning acres. | Least increase in available forage due to least amount of silviculture treatment and prescribed burning acres. |
| Impacts from recreation developments | N/A | Recreation increases the chance of cattle being harassed and moved to areas were resources are more limited. Typically this occurs by gates being left open as access to | Alternative 3 would have the greatest impact (with the most miles of new trail construction and designation proposed). | Alternative 4 would have the least impact (with the least miles of new trail construction and designation proposed). |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | | recreational sites is increased. Additionally, it is anticipated that as trails are created, more types of transportation would use the trails, further increasing the likelihood for the harassment of livestock, gates being left open, and fences being cut for access. | | |
| **Heritage** | | | | |
| Impacts to heritage sites | Fuels loads across the landscape would not be reduced. As such, the threat of severe or moderately severe wildfire would not contribute to the long-term stability of heritage sites. | The majority of the proposed activities are expected to have no, or extremely minor, direct effects on all known heritage sites within the project planning area as long as the project design criteria (PDCs) in the Magone DEIS Appendix C – Project Design Criteria are followed. In most cases, eligible or unevaluated sites would be avoided or properly mitigated throughout the lifetime of any of the proposed activities. Following the PDCs, there is no difference in the potential for effects between the three action alternatives. This is because all sites would be avoided or mitigations put in place. | | |
| **Roads** | | | | |
| Road density | Existing open road density is 1.1 miles/square mile. | Open road density would be 1.1 miles/square mile. | Open road density would be 1.1 miles/square mile. | Open road density would be 1.1 miles/square mile. |
| Miles of open road | 47 miles | 43.1 miles | 46.4 miles | 46.4 miles |
| Miles of closed roads | 63 miles | 65.4 miles | 63.3 miles | 63.3 miles |
| Miles of road to be decommissioned | N/A | 0.3 miles | 0.3 miles | 0.3 miles |
| **Visuals** | | | | |
| Scenic integrity | Scenic vegetation diversity is impaired, too dense, lacks extent of historical large trees.<br>No positive wildfire influences on vegetation | Treatments would improve the long-term scenic integrity, by opening the stands up for increased visibility and visual diversity. Prescribed fire | Scenic integrity benefits would be slightly greater than alternative 2. | Scenic integrity benefits would be slightly less than alternative 2. |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | structure/species. | would improve conditions for fire resistant species, which would indirectly improve landscape character attributes of large tree character and open stands that can withstand low intensity fires. | | |
| Scenic stability | Scenic stability project-wide most vegetation scenery attributes are impaired, some absent or not likely to be sustained due to ecosystem stress (wildfire imbalance; excess grand fir). | Scenic stability project-wide vegetation would shift towards historical conditions of fire adapted scenery attributes: meadows, aspen, diverse conifer canopy with more large, fire-adapted species.<br>Would reduce risk of scenery impairment from ecosystem disturbance events. | Scenic stability project-wide slightly more benefit and stability than alternative 2. | Scenic stability project-wide slightly less benefit than alternative 2. |
| Visual quality objectives (VQOs) | Existing disturbance is minor and widespread. Meets Malheur Forest Plan thresholds for all sensitive views (Magone and County Road 18). No new impacts, growing risk for ecosystem disturbances. | Widespread new minor disturbances within sensitive viewsheds (Magone and County Road 18). Would meet Forest Plan's VQO thresholds for all sensitive views. Reduced risk of ecosystem disturbance events. | Slightly more adverse scenery disturbance than alternative 2. | Slightly less adverse scenery disturbance than alternative 2. |
| **Other Undeveloped Lands** | | | | |
| Acres of other undeveloped lands in the project planning area | 3,900 acres | 2,100 acres | 1,750 acres | 2,740 acres |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.) | There would be no direct or indirect effects to undeveloped lands because no activities would occur in these areas. The existing condition would remain unchanged, except by natural processes and ongoing management activities. | For other undeveloped lands within the Magone project planning area where activities proposed under alternatives 2, 3, and 4 would occur, the impacts to soil, water quality, air quality, forage; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources are essentially the same as disclosed for areas of proposed project activity in described in other resource sections in Chapter 3 | | |
| Intrinsic social values (apparent naturalness, solitude remoteness) | | The following effects to other undeveloped lands are common to alternatives 2, 3, and 4. Silviculture treatments would increase the number of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. Prescribed burning would change composition and structure of vegetation. The sounds, smells, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the other undeveloped areas would reduce the sense of solitude and remoteness in the short-term, during project activities. Proposed road activities in other undeveloped lands would reduce the size of the other undeveloped lands polygons. These lands would appear managed and developed.<br>In the long-term the project would result in the development of historic open conditions characterized by larger diameter trees, though more stumps would be present. | | |
| **Climate Change** | | | | |
| Impacts to and effects of climate change on the Magone Project | There would be an increased indirect risk of wildfire, which could contribute carbon dioxide emissions through the burning of accumulated fuels.<br>Species composition and stand density would remain the same or trend toward late seral species and increased stand density, which would intensify effects from increased summer temperatures and drought, leading to increased stress to trees and | Under the action alternatives, up to 28,500 acres (under alternatives 2 and 3) and up to 17,200 acres (under alternative 4) are proposed for underburning. Underburning would release carbon dioxide into the air from the debris on the forest floor, but repeated underburns would produce substantially less emissions per acre than a wildfire, which consumes material from both the forest floor and the standing trees. Restoration of the forest by moving toward the historical range of variability, through thinning, would result in a low risk of uncharacteristically severe wildfire. This reduced risk has a direct beneficial effect of decreased carbon emissions from these acres because the risk of acres being burned by uncharacteristically severe wildfires would be reduced. The action alternatives are not expected to have a measurable change in the ability of the forest to sequester carbon. Thinning would reduce the number of trees, but the number of remaining trees left would still utilize most of the growing potential of the site with net growth remaining about the same. Harvesting wood and turning it into durable products such as lumber would sequester a portion of the carbon while retaining the capacity of the forest to absorb carbon from the atmosphere. Additionally, biomass utilization is itself a carbon neutral source of energy, but if it is replacing fossil fuel use there is a net reduction in atmospheric carbon. Overall, the combined effects of any of the action alternatives are expected to be a net reduction in atmospheric carbon. | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| | reduced ability to resist insects and disease. Increased fuel loadings and warmer, drier weather would increase the risk of large stand replacement wildfires.<br>Snowpack within the Blue Mountains is expected to be near 0 by the year 2080. The Transition from a snowpack driven system (gradual release) to a rain driven system would further degrade existing aquatic conditions due to the lack of instream and floodplain roughness for the majority of streams within the Magone project planning area.<br>Sections of stream which become intermittent (dry) during low flow periods would increase in extent. | Under the action alternatives there are varying levels of silvicultural treatments including commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal. Thinning would reduce forest density and improve the health and vigor of remaining trees, especially during periods of summer drought. A forest that is better adapted to handle disturbances, such as wildfire or disease, would be more resilient in the face of potential climate change in the future. Additionally, complete quantifiable information about project effects on global climate change is not currently possible and is not essential to a reasoned choice among alternatives. | | |
| **Forest Plan Amendments** | | | | |
| Changes to old growth boundaries | Old Growth (Management Area 13) boundaries would not be redrawn to bring yhe number of acres set aside for these habitats up to thresholds set in the Forest Plan. | Old Growth (Management Area 13) boundaries would be redrawn for 3 existing dedicated old growth areas (DOGs), create 2 pine marten replacement old growth areas (ROGs), and create 3 pileated woodpecker ROG/ pileated woodpecker feeding areas (PWFAs) within the project planning area to bring total acres up to Malheur Forest Plan habitat, size, and distribution requirements for alternatives 2, 3, and 4. The proposed DOG and ROG/PWFAs would be located within suitable late and old structure stands. There would be a net loss of approximately 312 acres of dedicated old growth, but an overall expansion of approximately 1,067 acres of the MA-13 network including DOGs and ROG/PWFAs. | | |

| Comparison element | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Reduce summer range cover below Malheur Forest Plan standards (12% for satisfactory cover in the Grub Creek subwatershed) | With no activities proposed, satisfactory, marginal, and total cover would continue to exceed standards in the short-term. | Satisfactory cover would be reduced from the existing 31.8 to 10.1%. | Satisfactory cover would be reduced from the existing 31.8 to 8.2%. | No amendment to this standard is proposed under alternative 4. |
| Reduce winter range (Management Area 4A) cover below Malheur Forest Plan standards (10% for satisfactory cover and 25% for total cover in the Grub Creek subwatershed) | With no activities proposed, satisfactory, marginal, and total cover would continue to exceed standards in the short-term. | Satisfactory cover would be reduced from the existing 29.5 to 5.9%. | Satisfactory cover would be reduced from the existing 29.5 to 3.3% and total cover from the existing 87.4 to 17.1%. | No amendment to this standard is proposed under alternative .4. |
| Reduce Nipple Butte Wildlife Emphasis Area (Management Area 21) cover below Malheur Forest Plan standard (20% for satisfactory cover and 40% for total cover) | With no activities proposed, satisfactory, marginal, and total cover would continue to exceed standards in the short-term. | Satisfactory cover would be reduced from the existing 46.8 to 16.5% and total cover from the existing 70.6 to 39.5%. | Satisfactory cover would be reduced from the existing 46.8 to 16.6% and total cover from the existing 70.6 to 39.3%. | No amendment to this standard is proposed under alternative 4. |

# Chapter 3. Affected Environment and Environmental Consequences

## 3.1 Introduction

Chapter 3 summarizes the physical, biological, social, and economic environments of the Magone project planning area, the effects of implementing each alternative on these environments, and the scientific and analytical basis for the comparison of effects by alternative. Chapter 3 complies with the implementing regulations of the National Environmental Policy Act (NEPA) for analytic and concise environmental documents (40 CFR 1500-1508).

In the development of the environmental analyses that follow, best available science was considered and is documented in the project record for each resource area. Consistency with the Malheur National Forest Land and Resource Management Plan, as amended (Malheur Forest Plan) was built into the project design and the analyses. The environmental analyses incorporate issues identified through the scoping process. An environmental effect, impact, or consequence is defined as a modification of or change in the existing environment brought about by the action taken. The NEPA regulations (40 CFR 1508.27) refer to effects that are direct, indirect, or cumulative as short-term or long-term. For this project, short-term is defined as around 1 to 10 years and long-term is defined as around 10 to 20 years, unless otherwise defined in the resource sections of this chapter. Effects can vary in degree, ranging from only a slightly discernible change to a measurable alteration in the environment.

The Silviculture; Fire, Fuels, and Air Quality; Soils; Watershed; Aquatic Resources; Wildlife; Botanical Resources; Range; Non-native Invasive Plants; Heritage; Recreation; Visuals; Economics; Roads; and Inventoried Roadless Areas and Other Undeveloped Lands reports are incorporated by reference into this draft environmental impact statement (DEIS). These reports are available upon request and are available on the Forest's website at: http://www.fs.usda.gov/projects/malheur/landmanagement/projects.

### 3.1.1 Consideration of Past, Ongoing, and Reasonably Foreseeable Actions in Effects Analysis

#### 3.1.1.1 Cumulative Effects

A cumulative effect is the impact to the environment resulting from the incremental impact of the action when added to effects from other past, present, and reasonably foreseeable future actions. Other actions are considered regardless of what agency or person undertakes such other actions and regardless of land ownership on which the other actions occur (40 CFR 1508.7). An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other actions, the effects may be significant.

Cumulative effects were assessed for this project in terms of how the alternatives would add to the past, present, and reasonably foreseeable future activities (Table 13 and Table 14). Existing conditions described under each resource section reflect the cumulative effects of past and present activities that have occurred in this area. Each resource section identifies specific past, present, and reasonably foreseeable future actions listed in Table 13 and Table 14 with a discernible effect on a particular resource as reflected in the existing condition.

**Past and Present Actions** – The environmental analysis required under NEPA is forward-looking in that it focuses on the potential impacts of the proposed action that an agency is considering. Thus, review of past and present (i.e., ongoing) actions is required to the extent that this review informs agency decision-making regarding the proposed action (Council on Environmental Quality Memorandum, Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, Forest Service National Environmental Policy Regulations (36 CFR 220.4(f)) (July 24, 2008). Specific past and present actions considered in the affected environment and cumulative effects analysis are summarized below. The past and present actions summary is not necessarily exhaustive, as records may not exist for all past activities by project. This is particularly true for those actions that predate the passage of the National Environmental Policy Act in 1970. Nonetheless, the effects of such past actions are accounted for in the assessment of the existing condition, as the current condition assessment necessarily reflects any relevant impacts of such actions.

**Reasonably Foreseeable Future Activities** – Each resource section describes any cumulative effects from the reasonably foreseeable future actions listed in this section. The reasonably foreseeable future activities overlap in time and location and may have environmental effects. The incremental effect of the action when added to the proposed activities was analyzed. Detailed descriptions of reasonably foreseeable future actions are listed here and are referenced in each resource section. The foreseeable actions for which the Magone Project proposed activities may have a cumulative effect are those listed on the Malheur National Forest's Schedule of Proposed Actions or have been identified as potential projects authorized under the Aquatic Restoration Decision.

The Malheur National Forest initiated an Aquatic Restoration Environmental Assessment (EA) in January 2014, and the decision notice and finding of no significant impact (DN/FONSI) was signed in September 2014. This decision authorized activities that are consistent with the 17 aquatic restoration categories described in that decision to be implemented following review of the activity with a Project Implementation Checklist to ensure the activity is consistent with the analysis and is within the criteria of the Aquatic Restoration Decision. The Magone Project interdisciplinary team has identified some potential future projects that may occur under the Aquatic Restoration Decision within the Magone project planning area (see Table 14).

**Table 13. Past, present, and reasonably foreseeable future activities within the Magone project planning area**

| Activity name | Timeframe | Location | Activity description |
|---|---|---|---|
| **Timber harvest** | | | |
| Past timber harvest | 1860s to 1990s | Throughout project planning area | Substantial timber harvesting that facilitated the removal of the large ponderosa pine, western white pine, western larch, and Douglas-fir in the Magone project planning area began in the 1930s with the Oregon Lumber Company.<br>Approximately 8,700 acres (32 percent) of the Magone project planning area were formerly owned and managed by the Oregon Lumber Company. These lands were acquired in a land exchange by the Malheur National Forest in the 1940s. It can be assumed that these lands were actively managed with timber harvest both before and after this exchange. Oregon Lumber Company moved |

| Activity name | Timeframe | Location | Activity description |
|---|---|---|---|
| | | | west and north into cat skidding and truck hauling in the early 1940s.<br>After the acquisition of this property in the 1940s and 1950s, harvest was primarily done by the use of the Keen's Vigor Classes (O'Hara et al. 2010). Overstory removal and regeneration harvests in this area started in the 1970s and continued through the 1990s.<br>Timber sales in the 1980s and 1990s included Beech, COGO, EBC, Ennis, Goon Salvage, Grub Salvage, Grub Overwood, Hay, Hog, Jugow, Keen Salvage, Lake Lodgepole, POC, Pond SSTS, Quick Salvage, SADD SSTS, Sulphur Creek, Thin Bear, and Yah. |
| County Road18 Healthy Forest Restoration Act Project | 2010 to ongoing | Adjacent to and overlapping the eastern project boundary | Ongoing treatment of designated fuel breaks created adjacent to County Road 18. Approximately 1,200 acres were commercially thinned and 1,600 acres were non-commercially thinned. Prescribed burning along this corridor is ongoing. |
| **Wildfire/timber salvage** | | | |
| Fire suppression | 1910 to present | Project planning area | In the recent past wildfires were actively suppressed leading to a buildup of ground fuels and overstocked stands. Because of current uncharacteristic fire behavior, all fires are being actively suppressed to reduce the chance of other major stand replacement fires.<br>The project planning area has averaged 3.4 fires per year over the last 30 years. This equates to an average of 1.26 fires per 1000 acres per decade. There have been no recorded fires larger than 25 acres within the project planning area. Two of the fires in 1910 burned within 2.5 miles of the project planning area. In addition, the Grouse Creek Complex burned within 0.2 miles in 2014. |
| OR-MAF 042 | 2010 | Southwest corner of the project planning area | Approximately 24 acre wildfire that burned within the Nipple Butte inventoried roadless area. |
| Cornett Fire | 2013 | West of 36/18 road junction | Approximately 20 acre wildfire that burned within the project planning area. |
| Prescribed fire | 1998 to 1999 | Round Top area | According to GIS data 4300 acres of underburning was completed between 1998 and 1999. |
| **Miscellaneous** | | | |
| Non-native invasive plant treatments | Ongoing | Project planning area | Noxious weed treatments on National Forest System lands have been done primarily by hand pulling, mechanical cutting (weed whacking), and grubbing; however, some biological controls were introduced in the 1990s. |
| Malheur National Forest Site- | Reasonably foreseeable | Project planning area | Treatment of known and newly discovered non-native invasive plants potentially using |

| Activity name | Timeframe | Location | Activity description |
|---|---|---|---|
| Specific Invasive Plants Treatment Record of Decision implementation | future activity | | herbicide, manual, mechanical, biological and/or cultural treatments. |
| Historical grazing | 1880 to 1940 | Project planning area | Much of the Magone project planning area was historically agricultural private land and/or used extensively by Civilian Conservation Corps crews during the 1930s to 1940s for the conservation and development of natural resources.<br>The area was intensively grazed during these years, including sheep in the 1800s and early 1900s. After the 1930s the U.S. Forest Service established grazing regulations. |
| Past grazing | 1940s to 1990s | Project planning area | Grazing area (allotments) were created by dividing the land with fences, stocking rates, seasons of use, and standards for allowable utilization of the resource were created. |
| Present grazing | 1990s to present | Project planning area | The John Day Allotment has 177 cow/calf pairs grazed per season, with 11,992 acres (64% of the allotment) within the project planning area.<br>The Beech Creek Allotment has 35 cow/calf pairs grazed per season, with 1,011 acres (26% of the allotment) within the project planning area.<br>The Roundtop Allotment has 200 cow/calf pairs grazed per season, with 12,398 acres (90% of the allotment) within the project planning area.<br>The Keeney Meadows Allotment has 57 cow/calf pairs grazed per season, with 63 acres (14% of the allotment) within the project planning area.<br>The Dixie Allotment has 173 cow/calf pairs grazed per season, with 64 acres (0.24% of the allotment) within the project planning area.<br>The Fox Allotment has 293 cow/calf pairs grazed per season, with 49 acres (0.19% of the allotment) within the project planning area.<br>The Long Creek Allotment has 967 cow/calf pairs grazed per season, with 68 acres (0.14% of the allotment) within the project planning area.<br>The Herberger Allotment has 8 cow/calf pairs grazed per season, with 155 acres (28% of the allotment) within the project planning area (currently not authorized to graze).<br>The McCullough Allotment has 33 cow/calf pairs grazed per season, with 478 acres (76% of the allotment) within the project planning area (currently not authorized to graze). |

| Activity name | Timeframe | Location | Activity description |
|---|---|---|---|
| Timber harvest in riparian habitat conservation areas (RHCAs) | 1960s to 1990s | Beech Creek | 226 acres in the 1960s, 0 acres in the 1970s, 981 acres in the 1980s, and 415 acres in the 1990s. |
| Riparian planting/ log weir and boulder placement | 1984 to present | East Fork Beech Creek | Placement of 220 boulders, 59 weirs, 20 log deflectors, and planting of 500 shrubs. |
| Developed recreation | Ongoing maintenance | Magone Lake recreation area | The Magone Lake Campground includes a developed fee campground with developed campsites, picnic tables, a boat launch area, multi-use dock, vault toilets, and a day-use beach area. |
| Dispersed camping | Ongoing maintenance | Throughout project planning area | There are 19 recorded dispersed campsites in the project planning area. |
| Hiker/horse/ bicycle/OHV trails | Ongoing maintenance | Project planning area | Approximately 7 miles of trails, including several short trails around Magone Lake and several bicycle trails near Magone Lake and along the northern portion of the project planning area. |
| Cross-country off-highway vehicle (OHV) use | Ongoing | Throughout project planning area | Cross-country OHV use occurs throughout the project planning area outside of the Nipple Butte inventoried roadless area. |
| Transportation activities (maintenance, construction, decommissioning) | 1991 to 2006 | Project planning area | Forest Service road (FSR) maintenance: blading FSR 36 (annually) and FSR, 3618, 3620, 3940, 3947 (every other year). FSR 3620 and 3618 were repaved in 2009 under the American Recovery and Reinvestment Act. |
| Travel Management Plan | Reasonably foreseeable future activity | Project planning area | The Malheur National Forest is required to develop a new vehicle use plan that would restrict cross-country travel by motorized vehicles to only specifically designated roads and trails. |
| Firewood cutting | Ongoing | Across the project planning area | Use is generally late spring through late fall. |
| 1 special use permit | Ongoing | Township 12 South, Range 31 East, section 18 | Use is a linear right-of-way for an electrical power line. |
| Other uses | Ongoing | Adjacent to private inholdings | Irrigation ditches. |
| Historical mining | | Project planning area | There is in evidence of historic mining taking place in the Magone project planning area. It is possible some low level prospecting took place but there are no sites recorded documenting any prospecting. |
| Mining claims<br>(varies from year to year) | Ongoing | Across the project planning area where lands are open to mineral entry | No mill sites, lode, or placer claims filed as of April 6, 2015.<br>Recent past claim activity within the project boundary included a lode claim file between 2006 through 2008. Activity was limited to minor assay and claim work. |

| Activity name | Timeframe | Location | Activity description |
|---|---|---|---|
| | | | Lode claims are usually parallelogram shaped with the longer side lines parallel to the vein or lode. They are limited by stature to a maximum of 1,500 feet in length along the vein or lode and 300 feet on either side. Present activity is mostly limited to assay work and minor claim work. No large commercial operations are active at this time. |

As stated above, the Magone Project interdisciplinary team has identified some potential future projects that may occur under the Aquatic Restoration Decision within the Magone project planning area. A project implementation checklist will be used to ensure each activity is consistent with the analysis and project design criteria in the Aquatic Restoration EA and Decision. Pre-project notification will be posted at least 30 days prior to implementation of the activity on the Malheur National Forest's web site at http://www.fs.usda.gov/land/malheur/landmanagement. Post-project notification will also be posted on this website. This webpage is designed to provide information about aquatic restoration activities on the Malheur National Forest and provides baseline information as to planning documentation (NEPA) and associated consultation. The webpage will also provide an annual list of projects to be implemented by each Ranger District.

Pre-project notification is the time for individuals and organizations interested in specific aquatic restoration projects to contact the project lead with questions or suggestions related to implementation of that project. Table 14 is a summary of potential projects authorized under the Aquatic Restoration Decision that may occur in the Magone project planning area to allow the interdisciplinary team to analyze the cumulative effects from these reasonably foreseeable future activities.

**Table 14. Reasonably foreseeable future activities authorized under the Malheur National Forest Aquatic Restoration Decision[7] within the Magone project planning area**

| Activity name | Location | Activity description |
|---|---|---|
| Fish passage restoration | Project planning area | Replacement or removal of approximately 10 culverts in the Grub Creek and East Fork Beech Creek subwatersheds. |
| Riparian enhancement | Clear, East Fork Beech, Thompson, and Tinker creeks | Large woody debris (LWD)/coarse woody debris (CWD) augmentation along approximately 9 miles of stream. A majority of these trees would come from upland tipping units. |
| Riparian enhancement | Clear, McClellan, and Thompson creeks | Coarse woody debris placement into approximately 5 miles of stream through chainsaw felling and helicopter placement. Headcut repair within Thompson Creek and Tributary to facilitate aggradation of stream channel and restore floodplain connectivity. |

[7] The Aquatic Restoration Environmental Assessment includes a number of individual actions that, when grouped together, represent an overall watershed and fish habitat restoration program. Projects may occur at many individual sites across the Malheur National Forest, including those National Forest system lands on the Ochoco National Forest administered by the Malheur National Forest. Site-specific action areas are located in fish and non-fish-bearing streams, riparian areas, and uplands that have a direct link to restoration of aquatic habitat and watershed function.

| Activity name | Location | Activity description |
|---|---|---|
| Riparian enhancement | Clear, East Fork Beech, Thompson, and Tinker creeks | Tree tipping and LWD/CWD addition to approximately 13 miles of stream, as well as approximately 1 mile of cable winching from the adjacent hillslope at the bottom of East Fork Beech Creek. Excavation of pools would occur where suitable to allow den building by beaver. LWD/CWD would be placed in conjunction with beaver support structures to provide anchor points for beaver dams. |
| Riparian enhancement | Tinker Creek | Remove/reduce lodgepole pine encroachment along approximately 3 miles of stream. Lodgepole pine would be placed in stream and floodplain to create LWD and CWD. Pools would be excavated in association with lodgepole placement and beaver support structures to provide cover for beaver and provide streambank accessibility for dens. |
| Juniper, hawthorn, and aspen treatment | Clear, East Fork Beech, McClellan, Thompson, and Tinker creeks | Juniper and hawthorn would be chainsaw felled or removed with rootwad attached and placed within the stream channel and adjacent floodplain along approximately 12 miles of stream. Patches of hawthorn would be treated with fire to facilitate expansion of desirable riparian shrubs when applicable. Aspen treatment includes the removal of conifers currently shading aspen stands. Conifers >21 inches may be girdled to create wildlife snags and or used for stream treatments. |
| Juniper thinning | Project planning area | Juniper would be thinned on approximately 3,000 acres to assist in returning ground water to previous levels. |
| Log weir and boulder modification | Clear and East Fork Beech creeks | Existing log weirs (approx. 58) would be modified and placed at appropriate angles to facilitate pool formation, lateral channel migration, and gravel deposition. Boulders placed as rip-rap would be used within the active stream channel to anchor large and coarse woody debris and create in-channel roughness. |
| Legacy structure removal | Clear, Lake, Thompson, and Tinker creeks | Alluvial fan restoration at 4 sites; legacy floodplain structure removal (e.g., rock berms, rip–rap, rock barbs and other related rock piles) along approximately 700 feet of stream. |
| Reduction of recreation impacts and road erosion control | Project planning area | Stormproof Forest Service road (FSR) 3600-102 and improve the dispersed campsites along this road. Harden first couple hundred feet of FSR 3618-083. Remove pioneered road extension crossing Clear Creek within the inventoried roadless area on FSR 3940-071 and relocate dispersed campsite currently at end of pioneered road to actual end of road. |

| Activity name | Location | Activity description |
|---|---|---|
| Off-channel livestock watering facilities | Project planning area | Maintain existing water troughs (18 known). Maintain existing ponds (28 known). Develop at least 10 spring sites into water troughs. |
| Riparian vegetation (hardwood) planting | Clear, East Fork Beech, McClellan, Thompson, and Tinker creeks | Plant riparian hardwoods (willow, dogwood, cottonwood) along approximately 15 miles of stream. |
| Riparian hardwood restoration monitoring fencing | Clear, McClellan, and Tinker creeks | Temporary fencing in the most sensitive riparian areas along approximately 2.5 miles of stream (totaling about 40 acres of area fenced). |
| Beaver habitat restoration | Clear, East Fork Beech, McClellan, and Tinker creeks | Beaver habitat restoration along approximately 7 miles of stream. Beaver support structures and bioengineering techniques would provide potential sites for future beaver dam construction. |
| Large and coarse wood placement | East Fork Beech Creek | Fell and place medium and large trees, tops, and variety of coarse large wood typical of non-commercial thinning across gullies and areas with sheetflow resulting from culvert drainage (County Road 18) at densities similar to wood placement for fisheries; place CWD to dissipate energy at outlet of culverts. |
| Accelerate recovery of roads previously decommissioned. | Project planning area | Decompact (backhoe with bucket) approximately 5 miles of former roadbed in East Fork Beech Creek valley, including segments of FSR 3600-043, 3600-058, and 3600-080. |

# 3.2 Key Issue – Level and Effects of Silviculture Treatments

## 3.2.1 Forest Vegetation

### 3.2.1.1 Historical Condition

Settlement in the John Day area by European immigrants began in the mid-1800s, initially by those involved in mining and grazing. The formation of the National Forests began in the early 1900s, along with timber harvesting, intensive grazing, and eventually fire suppression. Local timber harvesting occurred in the early 1900s throughout the Magone area. Substantial timber harvesting that facilitated the removal of the large ponderosa pine, western white pine, western larch, and Douglas-fir in the Magone area began in the 1930s with Oregon Lumber Company. Oregon Lumber Company moved west and north into cat skidding and truck hauling in the early 1940s (Figure 1). Approximately 1/3 of the project planning area was in private land holdings after the formation of the National Forests, most of which was owned by Oregon Lumber Company. Acquisition of the private holdings into the National Forest system in the Magone area began in the late 1920s and ended in the 1980s. After the acquisition of this property, harvest was primarily done by the use of the Keen's Vigor Classes (O'Hara et al. 2010). Overstory removal and regeneration harvests in this area started in the 1970s and continued through the 1990s.

The Nipple Butte Inventoried Roadless Area (IRA) makes up 10,018 acres of the 27,000+ acre Magone project planning area. A few acres within the IRA have open roads and have had some harvest and planting activities in the past.

**Figure 1. Stand of virgin ponderosa pine, Malheur National Forest, Grant County, Oregon (color transparency; July 1942).**

Due to fire suppression over the last century, the fuel loading in the East Fork Beech Creek and Grub Creek subwatersheds has changed. Historically, fire was the dominant disturbance on the landscape due to Native American burning and lightning strikes during thunder storms. The Warm Dry forests within the project planning area are classified as fire regime 1 (Schmidt et al. 2002). This fire regime included frequent (zero to 35 year return interval), low severity fires. The extent of these frequent ground fires likely varied from small areas (less than 10 acres in size) to entire slopes covering thousands of acres depending upon the season, topography, and climatic conditions. These fires were agents of stability, favoring fire resistant species (ponderosa pine, western larch, and to a lesser extent Douglas-fir) and development of more open, park-like stands with little vertical structure. They also maintained ground vegetation dominated by fire-adapted grasses such as pine grass and elk sedge. Shade tolerant species (grand fir and Douglas-fir) were generally susceptible to these fires due to their thinner bark when young, and persistent, low hanging crown characteristics.

Fire intensity also varied in response to vegetative conditions. Small areas of denser forest patches occurred in areas missed by fire or more resistant to fire (draws, spring seep areas, and northerly aspects). Areas missed by frequent fires developed conditions where subsequent fires could potentially be of moderate to high intensity, resulting in stand replacement patches.

The ingrowth of late seral species and increased stand densities have also helped to create conditions promoting insect outbreaks. A spruce budworm outbreak in the mid-1980s and early 1990s has created dead and down grand fir and Douglas-fir, and live grand fir and Douglas-fir with poor crowns, reduced growth, and dead or forked tops (Scott and Schmitt 2012, Spiegel 2014).

**Figure 2. Left photo: Conifer encroachment into an area that was previously an open ponderosa pine. Right photo: Douglas-fir with dead top from previous insect infestation and large mistletoe brooms.**

### 3.2.1.2 Existing Condition

The Magone project planning area is approximately 27,182 acres. It is made up of roughly 23,300 acres of forested ground, and 3,880 non-forested acres. Six upland forest (UF) plant association groups (PAGs) occur within the Magone area. The project planning area is greater than 15,000 acres; therefore, it is of the appropriate size to conduct an historic range of variability (HRV) analysis (Powell 2012). According to Powell (2012), it is not appropriate to conduct an HRV analysis for a PAG 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 amount of acreage. Therefore, five PAGs—Cool Moist Upland Forest, Cold Dry Upland Forest, Hot Dry Upland Forest, Warm Dry Upland Forest, and Warm Moist Upland Forest—exceed 1,000 acres and will be analyzed for HRV based on structure stages.

**Table 15. Plant association groups within the Magone project planning area**

| Plant association group | Acres within project planning area[a] | Percentage of total project planning area |
|---|---|---|
| Hot Dry Upland Forest | 3,646 | 14% |
| Warm Dry Upland Forest | 14,233 | 52% |
| Cool Moist Upland Forest | 2,073 | 8% |
| Cold Dry Upland Forest | 1,007 | 4% |
| Warm Moist Upland Forest | 2,242 | 8% |
| Other Upland Forest types, each less than 1,000 acres | 3,882 | 14% |
| | FVS Upland Forest acres 23,300<br>Total project planning area acres 27,182 | 100% |

a Acres from Forest Vegetation Simulator (FVS) are not exact to project acres as FVS uses whole stand acres. The project planning area boundary may split some stands. However, percentage of PAGs would be consistent for the project planning area.

Juniper woodlands make up approximately 2,500 acres of the total project planning area, or about 9 percent of the total area. About 5 percent of the total area is herblands and shrublands. Much of this unforested area has had vegetation changes over time due to fire suppression and other management actions. Juniper has been encroaching into other vegetation types, including herblands, shrublands and some neighboring forested areas.

Approximately 1/3 of the upland forested acres found in the Magone project planning area are located within the Nipple Butte IRA. Almost half of the Cool Moist PAG is located within the IRA.

### *Management Zones*

Stand density index (SDI) 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. This limit is known as the maximum SDI (Max SDI). The percentage of Max SDI (SDI/Max SDI) is an index of intra-tree competition for site resources and is an indication of overall stand health, tree growth and mortality, susceptibility to mortality from insect and disease, and fire hazard. Percentage Max SDI is generally divided into categories that define tree growth, stand growth, and mortality. Below the management zone (MZ), which is stand densities of zero to 40 percent Max SDI, there may be natural regeneration and there is generally high individual tree growth within the stand. The MZ (40 to 60 percent Max SDI) is where silviculturists tend to prescribe to manage within, because site resources are generally being captured into tree growth and there is high stand growth. Above the MZ consistent completion may induce increased mortality. As stands grow above the MZ susceptibility to insect infestation and high severity, stand replacement wildfire may increase. Figure 3 below shows that over 80 percent of the Magone project planning area is above the MZ, with high stand densities that are susceptible to competition induced mortality, insect and disease infestation, and high severity fires.

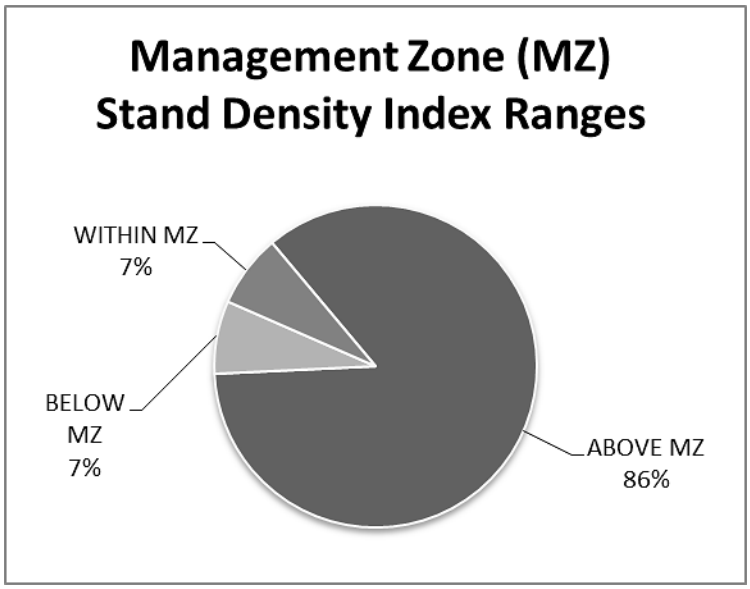


**Figure 3. Magone stand density index ranges.**

All structural stages are represented (Table 16). Late and old structure includes old forest single stratum and old forest multi strata. There is approximately 27 percent late and old structure within the Magone project planning area (Table 16). Over 50 percent of late and old structure in the Magone project planning area is located either in the Nipple Butte IRA or previously designated old growth areas.

**Table 16. Structural stages within the Magone project planning area**

| Structure | Acres within upland forest[a] | Percentage of upland forest | Acres of upland forest within Nipple Butte IRA |
|---|---|---|---|
| Old forest single stratum (OFSS) | 856 | 4% | 525 |
| Old forest multi strata (OFMS) | 6,654 | 28% | 3,948 |
| Young forest multi strata (YFMS) | 3,956 | 17% | 1,101 |
| Stem exclusion open canopy (SEOC) | 4,963 | 21% | 1,385 |
| Stem exclusion closed canopy (SECC) | 5,344 | 23% | 686 |
| Understory reinitiation (UR) | 1,314 | 6% | 104 |
| Stand initiation (SI) | 212 | <1% | 36 |
| **Total** | **23,299** | | |

[a] The total acres is the sum of only upland forest PAGs in Table 15 above.

### *Hot Dry Plant Association Group*

Hot Dry upland forests occupy approximately 66 percent of the project planning area (Table 15). The project planning area has drainages oriented mostly in a north to south direction, which lends itself to mostly southeast, south, and southwest facing slopes. The Hot Dry PAG (Table 17) includes many of the ponderosa pine plant associations. Currently stand initiation (SI), understory reinitiation (UR) and old forest single stratum (OFSS) are below the historical range of variability. Old forest multi strata (OFMS) and stem exclusion with open canopy (SEOC) are above the historical range in the Hot Dry plant association group.

**Table 17. Hot Dry plant association group historical range of variability analysis**

| Structure | Historical range of variability | Existing condition |
|---|---|---|
| Old forest single stratum (OFSS) | 20-70% | 1% |
| Old forest multi strata (OFMS) | 5-15% | 22% |
| Young forest multi strata (YFMS) | 5-20% | 21% |
| Stem exclusion open canopy (SEOC) | 5-20% | 51% |
| Stem exclusion closed canopy (SECC) | 0-5% | 0% |
| Understory reinitiation (UR) | 5-20% | 2% |
| Stand initiation (SI) | 5-15% | 2% |

### *Warm Dry Plant Association Group*

The Warm Dry PAG includes some of the ponderosa pine plant associations, some of the Douglas-fir plant associations, and a few of the drier grand fir plant associations (up to and including the grand fir/birchleaf spirea association). Ground vegetation generally consists of pine grass, elk sedge, Idaho fescue, bluebunch wheatgrass, mountain big sagebrush, mountain mahogany, common snowberry, bitterbrush and birchleaf spirea. The Warm Dry plant associations are above the historic range in OFMS and SECC, but below in OFSS and SI (Table 18).

**Table 18. Warm Dry plant association group historical range of variability analysis**

| Structure | Historical range of variability | Existing condition |
|---|---|---|
| Old forest single stratum (OFSS) | 15-55% | 3% |
| Old forest multi strata (OFMS) | 5-20% | 30% |
| Young forest multi strata (YFMS) | 5-25% | 21% |
| Stem exclusion open canopy (SEOC) | 5-20% | 12% |
| Stem exclusion closed canopy (SECC) | 1-10% | 26% |
| Understory reinitiation (UR) | 1-10% | 7% |
| Stand initiation (SI) | 5-15% | <1% |

### *Cool Moist Plant Association Group*

The Cool Moist PAG is represented by an array of plant associations (Powell et al. 2007), indicating the wide range of environments they occupy. There are approximately 2,073 acres of the Cool Moist PAG in the Magone project planning area. The Cool Moist PAG includes many of the grand fir, lodgepole pine (grand fir), lodgepole pine (subalpine fir), and subalpine fir plant associations. The Cool Wet PAG includes the grand fir/Pacific yew plant associations. Ground vegetation generally consists of big huckleberry, queencup beadlily, grouse huckleberry, twinflower, false bugbane, Pacific yew, and a wide variety of herbs and shrubs.

Most stands within the Cool Moist PAG are mixed conifer. Species composition includes ponderosa pine, lodgepole pine, western larch, Douglas-fir, and grand fir. These stands are generally uneven-aged, with trees ranging from seedlings and saplings to large, old trees (300+ years). The large, old trees tend to be early seral, ponderosa pine, and western larch. However, large, old grand fir and Douglas-fir also exist in moist pockets and protected areas. Younger trees are predominantly grand fir, however, due to the productivity of these sites small openings in the canopy provide the conditions for natural regeneration of early seral species also.

These stands tend to be very dense, have a high degree of structural diversity, and have many large diameter trees and snags. Currently, stem exclusion open canopy, old forest multi strata, and old forest single stratum are all above historic range, while understory reinitiation and young forest multi strata are well below the historical range of variability (Table 19).

**Table 19. Cool Moist plant association group historical range of variability analysis**

| Structure | Historical range of variability | Existing condition |
|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 10% |
| Old forest multi strata (OFMS) | 10-30% | 48% |
| Young forest multi strata (YFMS) | 40-60% | 3% |
| Stem exclusion open canopy (SEOC) | 0-5% | 13% |
| Stem exclusion closed canopy (SECC) | 5-25% | 24% |
| Understory reinitiation (UR) | 5-25% | <1% |
| Stand initiation (SI) | 1-10% | 1% |

### *Cold Dry Plant Association Group*

Cold Dry forest occupies approximately 1,000 acres of the project planning area. These stands are scattered throughout the planning area and are generally found in drainages. Currently, the Cold Dry PAG has three stand structures within the historical range of variability. Both of the stem exclusion structures are well above the historical range, while stand initiation, young forest multi strata and old forest multi strata structures are below the historical range (Table 20).

**Table 20. Cold Dry plant association group historical range of variability analysis**

| Structure | Historical range of variability | Existing condition |
|---|---|---|
| Old forest single stratum (OFSS) | 10-40% | 13% |
| Old forest multi strata (OFMS) | 0-5% | 1% |
| Young forest multi strata (YFMS) | 10-40% | 3% |
| Stem exclusion open canopy (SEOC) | 0-5% | 34% |
| Stem exclusion closed canopy (SECC) | 5-20% | 36% |
| Understory reinitiation (UR) | 5-25% | 13% |
| Stand initiation (SI) | 1-20% | <1% |

### *Warm Moist Plant Association Group*

Warm Moist forests occupy approximately 2,240 acres of the project planning area. These stands are scattered throughout the project planning area and occur predominantly in lower elevations near many of the streams, as well as some upper elevation knobs. Both old forest stand structures are within historical range of variability, while both stem exclusion stand structures are above the historical range. Understory reinitiation, young forest multi strata and stand initiation are all below the historical range of variability (Table 21).

**Table 21. Warm Moist plant association group historical range of variability analysis**

| Structure | Historical range of variability | Existing condition |
|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 2% |
| Old forest multi strata (OFMS) | 10-30% | 25% |
| Young forest multi strata (YFMS) | 20-50% | 4% |
| Stem exclusion open canopy (SEOC) | 0-5% | 36% |
| Stem exclusion closed canopy (SECC) | 5-20% | 31% |
| Understory reinitiation (UR) | 5-20% | 2% |
| Stand initiation (SI) | 1-15% | <1% |

Snags exist in the Magone project planning area. The existing levels of snags are the result of high stand densities that increase competition induced mortality (Figure 4), previous insect outbreaks, and diseases.

**Figure 4. Photos of stands within the Magone project planning area that illustrate high densities.**

### *Non-forest*

Plant association groups outside upland forest makes up about 3,880 acres (about 14 percent of the total project planning area). This includes some of the following:

**Juniper woodlands** make up approximately 2,500 acres of the Magone project planning area. These are Hot Dry and Hot Moist upland woodlands.

**Sagebrush and grassy scabby areas** make up approximately 1,250 acres. While juniper is a native tree species, fire suppression has allowed encroachment into areas previously occupied predominantly by grasses and other herbaceous and shrub plant types. Scabby areas that previously had open grass and mountain mahogany have been overtaken by pine and juniper. Both species compete for an already scarce supply of water. Juniper is the most efficient at getting the water and creating an environment where other plants cannot compete as well. Some of these mountain mahogany areas are also being shaded out by competing conifers. Mountain mahogany is intolerant to the shade created by the encroaching conifers.

**Figure 5. Left photo: Young pine and juniper in what was previously an open mountain mahogany stand with an occasional legacy pine or juniper. Right photo: Mountain mahogany being shaded out by encroaching conifer.**

Other areas within the Magone project planning area have populations of bitterbrush and Scouler's willow in declining amounts. Pine, juniper, grand fir, and Douglas-fir have slowly invaded openings over time, reducing the vigor of bitterbrush and Scouler's willow. Fire suppression has reduced the openings of mineral seed bed necessary for bitterbrush to seed in. Scouler's willow communities have subterranean root crowns that resprout following fire (OSU 2005).

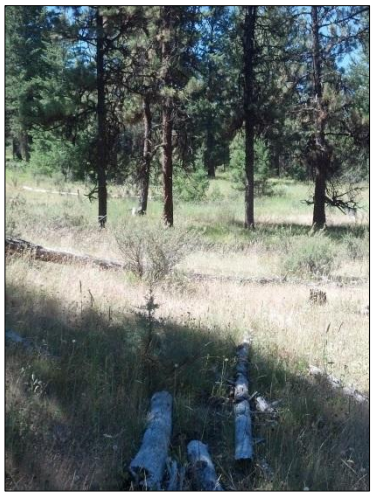

**Figure 6. Left photo: Scouler's willow with sprouts. Right photo: Bitterbrush with pine invading.**

**Aspen Stands**: Aspen is found in approximately 10 locations within the Magone project planning area. Aspen provides unique habitat for many wildlife species within coniferous forests, and it is currently much reduced from its historical extent. It appears that the combination of fire suppression, heavy browsing by both domestic and wild ungulates, conifer encroachment, and lowering of the water table has reduced the survival of aspen within Magone project planning area.

Aspen is considered a shade-intolerant species, and conifers have become established and are overtopping the aspen in many stands. The aspen overstory of most stands is single-storied and even-aged with many likely close to the end of their natural life cycle. Aspen is relatively short lived and relies on regeneration to maintain healthy stands. Successful fire suppression has removed the disturbance agent that stimulated suckering and limited conifer establishment. Many of the stands are still suckering, but at a reduced rate and most suckers do not reach sapling size because of big game and cattle browsing.

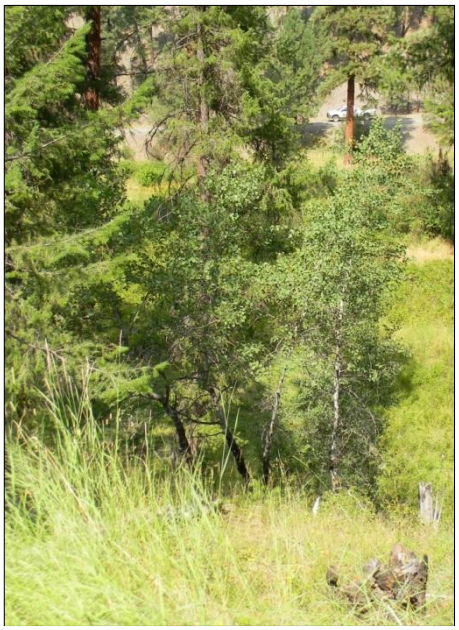

**Figure 7. Small aspen patch in the Magone project planning area.**

Dry meadows and grasslands are found in several locations within the planning area and are characterized by generally shallow and rocky soils. They were historically maintained by frequent wildfires in an open savannah condition with a few widely spaced ponderosa pine trees and juniper woodlands. With fire suppression and historic grazing, there has been varying degrees of ingrowth of juniper and ponderosa pine trees.

**Figure 8. Example of dry meadow with conifer encroachment from the outer edges.**

### *Disturbance Processes*

The Magone project planning area has historically and is currently being affected by many disturbance agents. These include insects, diseases, fire, and human related disturbances such as timber harvest, fire suppression, and grazing. Fire has played a major role in shaping the structure, species composition and density of this area, and would continue to play this role into the future. The role of fire on the landscape and the relatively recent fire events were discussed in the historical condition section, as well as previous timber harvest, fire suppression, and grazing.

#### Insects

There are many insects present within the Magone project planning area, which include bark beetles and defoliators. Currently, all of the insects present are at low levels. At these levels, they play an important role in contributing to structural diversity and providing dead wood habitat for wildlife and soil productivity. Scattered individual tree mortality creates small openings in stands where pockets of understory can establish.

Bark beetles are the most common insects present in the dry forests. The western pine beetle and mountain pine beetles have been killing at a low level for the past 4 years (Spiegel 2014).

The main defoliating insect present within the Magone project planning area is the spruce budworm. The 1982-1991 western spruce budworm outbreaks in the Blue Mountains were evident in some areas in the Magone project planning area. Older grand fir with dead tops are present in some stands. Fir engraver galleries were visible on older dead grand fir (Spiegel 2014).

**Diseases**

There are many diseases prevalent within the Magone project planning area. The major diseases include dwarf mistletoes, armillaria, annosus, and Indian paint fungus. As with insects, these diseases play an important role in creating structural diversity, creating a source of snags and down logs, providing important wildlife habitat and recycling nutrients to maintain soil productivity. At severe levels, these diseases can greatly inhibit tree growth and old forest structure. They also provide unique wildlife habitat, such as roosting sites for grouse.

The primary species infected by dwarf mistletoe are ponderosa pine, western larch, lodgepole pine, and Douglas-fir. Historically dwarf mistletoe was present in low levels. It predisposed the occasional tree to bark beetle attack or torching by fire. Frequent fires likely kept overall levels of mistletoe low due to “fire pruning” of infected branches and through potential negative impacts of the heat and smoke on developing mistletoe plants. Mistletoe is abundant in the Magone project planning area. In a few locations a portion of the pole sized to mature western larch is infected with mistletoe, which is the primary reason for western larch mortality. Ponderosa pine mistletoe, Douglas-fir and lodgepole pine mistletoe are also found in isolated pockets within many of the stands.

The primary root diseases in the Magone project planning area are annosus and armillaria that result in small “centers” of mortality and associated gaps in the forest canopy. They are generally found in conjunction with bark beetles. Historically root disease infection levels were generally low because of the higher proportion of early seral species and lower stand densities. Frequent fires also helped keep root diseases at low levels due to the promotion of soil fungi that compete with pathogenic fungi, and through beneficial effects of fire on soil nutrients and nutrient cycling.

There are scattered centers of annosus throughout the project planning area that are generally associated with previous logging. Annosus (Heterobasidion annosum) is mostly present in grand fir stands and is spread by spores in the air entering cut stumps and moving down through the roots. Its main hosts are grand fir, Engelmann spruce, Douglas-fir, and ponderosa pine. It causes severe root and butt decay, growth loss, and tree mortality (Goheen and Willhite 2006).

Conks of Indian paint fungus have been found within the project planning area, mostly associated with Cool Moist stands and late seral tree species.

### 3.2.1.3 Indicators for Assessing Effects

The analysis indicators for assessing effects of each alternative and for comparing alternatives include the historical range of variability (HRV) as defined by structural stages across the landscape, stand density, species composition, and the extent to which the area is treated to achieve these objectives and provide for the accelerated restoration strategy of treating more acres and providing forest restoration jobs. These indicators and how they are measured are described in the existing condition section above.

**Table 22. Silviculture resource indicators and measures for assessing effects**

| Objective | Indicator | Justification |
|---|---|---|
| Change structural stages to be within, or moving towards historical range of variability (HRV) | Percentage change of structural stages in relation to HRV | Regional Forester's Forest Plan Amendment #2 (USDA Forest Service 1995a) |
| Reduce stand density across the project planning area | Percentage change of acres above the management zone (MZ), within the MZ, and below the MZ as defined by maximum stand density index (Max SDI) | Suggested stocking levels for forest stands in northeastern Oregon and southeastern Washington: an implementation guide for the Umatilla National Forest (Powell 1999) |
| Provide wood products and forest restoration jobs | Acres mechanically treated | Malheur Forest Plan (USDA Forest Service 1990) |

### 3.2.1.4 Methodology

Information concerning stands has been gathered through a combination of photo interpretation, formal timber stand exams in 2000-2001, 2010, 2012, and 2014, and walk-throughs in 2014.

Modeling was used to project stand development through 40 years for future structural stages, stand density, and species composition. The FSVeg Data Analyzer program was used to run the nearest neighbor analysis and Forest Vegetation Simulator on all of the forested stands within the Magone project planning area. The nearest neighbor analysis populates stands without current stand exam data using similar stands with exam data. The Forest Vegetation Simulator model, with the Blue Mountains variant, was used to grow stands to 2015, and then apply prescriptions to the stands proposed and project stand growth and development for 40 years. Due to the delineation of stands, and for the purposes of efficiency, the stands were modeled in their entirety, including riparian habitat conservation area (RHCA) portions where applicable. All mechanical treatments, including the riparian enhancement treatments that are proposed within the Magone Project, as well as the first application of prescribed burning were simulated in this analysis. FVS projections were then used to compare stand structure, stand density, and species composition between the no action alternative (alternative 1) and action alternatives (alternatives 2, 3, and 4) to determine if they met project goals. Long-term projections are estimates at best; however, results do show trends and are useful for comparing different alternatives.

Assumptions for estimating effects include:

- HRV approximates the desired future condition.
- The 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.
- The 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 the Warm Dry PAG would be kept at low levels by periodic underburning, assuming future treatment.

Assumptions for the FSVeg Data Analyzer model include:

- Benchmarks for the future structural stage analysis are set at 10 and 40 years in the future.
- The mechanical treatments in the action alternatives are only applied once, at the start of the modeling time period. They are not repeated again within the 40 year modeling cycle.
- The prescribed burning in the action alternatives are only applied once in the first cycle of FVS. Prescribed burning was not repeated again within the 40 year modeling cycle.
- The 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 (wildfire, insects, wind, etc.).

The above modeling constraints are used to simplify the analysis and are only for comparative purposes between the no action alternative and the action alternatives. They are not intended to accurately predict actual future conditions. Based on science and professional knowledge, it is reasonable to believe that climate change and future disturbances will occur that affect the vegetation in the Magone project planning area. However, due to the uncertainty and unpredictability of these events, and how forest vegetation will respond to them, they were not incorporated in this analysis which is for comparison purposes only. These assumptions were made because it is impossible to predict when, where, what, and the extent of future disturbances and because there is still great uncertainty to the effects of future climate change. Scientists agree that the future climate in the Blue Mountains will be hotter, but there is great uncertainty as to whether it will be drier or wetter. Changes in the amount, form, and timing of precipitation could have drastic effects on forest extent, composition, and diversity.

### *Spatial and Temporal Context for Effects Analysis*

The boundary used for the direct and indirect effects analysis was the Magone project planning area, which included the East Fork of Beech Creek and the Grub Creek subwatershed boundaries. The boundary used for the cumulative effects analysis include the Magone project planning area. The Camp Lick project planning area to the east, and the private lands to the south and interspersed within the Magone project boundary were considered while analyzing connectivity issues. This area is approximately 70,000 acres.

The timeframe for the direct and indirect effects of vegetation management is relatively short-term for forest development. Direct and indirect effects are assessed 10 and 40 years after treatment. The timeframe for cumulative effects is relatively long-term for forest development and includes cumulative effects of current restoration treatments, and the Magone Project on species composition, stand density, and stand structure.

### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

The past activities that have cumulative effects to forest vegetation within the Magone project planning area include historic timber harvest, more recent timber harvesting in the 1970s through the 1990s, fire suppression, wildfire, timber salvage, planting following regeneration harvest, and grazing. Most of these activities are discussed in the historical condition section of this report. Until recently timber salvage was a common practice on the Malheur National Forest. Salvage helped prepare sites and pay for extensive planting following disturbances, such as large scale insect infestation.

Planting within regeneration harvests was generally dense, up to 680 trees per acre, and included planting predominantly ponderosa pine, but also included western larch, Douglas-fir, Engelmann spruce, and even lodgepole pine in some areas. Dense planting, along with abundant natural regeneration in some areas, provided for young, dense stands of predominantly early seral species.

Historical grazing practices started with primarily high numbers of sheep in the area in the late 1800s and early 1900s. In the early to mid-1900s grazing transitioned into primarily cattle grazing and is currently 100 percent cattle grazing. Cattle numbers have dramatically decreased over time and grazing is currently a vigorously monitored and managed activity within and adjacent to the project planning area. Due to historical grazing practices, fire suppression, and the climate in the early 1900s natural regeneration of tree species was stimulated, beginning the density increases of the 20th century. Current grazing practices generally do not impact the competing vegetation enough to influence natural regeneration success.

The recent past and present activities that have cumulative effects to the forest vegetation include plantation maintenance; activities authorized by the Aquatic Restoration Decision; portions of the County Road 18 Project; portions of the Beech Timber Sale, Hay Timber Sale, and other small salvage sales; grazing; and continued fire suppression. The County Road 18 Project is the most recent, and covers about 1,234 acres in the Magone project planning area. Within the Magone project planning area, the County Road 18 Project has portions of 20 units equaling 1,015 acres of thinning and piling, 10 acres no treatment for wildlife corridor, and an additional 210 acres of underburning. The County Road 18 Project was designed to reduce fuels along the main County Road 18 corridor.

Reasonably foreseeable activities that would cumulatively effect the vegetation in the Magone project planning area includes the Camp Lick Project. This project is a 40,000-acre restoration project that is within the Camp and Lick subwatersheds, and is adjacent to Grub (to the east) and East Fork Beach Creek (to the northeast) subwatersheds. This project would reduce stand density, shift species composition by reducing the abundance of late seral species, and move forest structure closer to HRV through commercial and non-commercial mechanical methods and through prescribed burning. Cutting trees within the RHCA under the aquatics restoration decision would not alter the results of the FVS analysis described above.

### 3.2.1.5 Alternative 1 – No Action

#### *Direct and Indirect Effects*

Given no action, the Magone project planning area would continue growing on its current trajectory. Forested stands would continue to be overstocked with high proportions of late seral species. Stand structure would shift from predominantly young forest structure to predominantly old forest structure, almost tripling the amount of late and old seral stage forest (old forest single stratum and old forest multi strata) from approximately 28 percent to 64 percent of OFMS, and from 4 percent to 15 percent of OFSS in 40 years. SI does not change over time (Table 23).

**Table 23. No action alternative structure change over time**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 4% | 5% | 15% |
| Old forest multi strata (OFMS) | 10-30% | 28% | 40% | 64% |
| Young forest multi strata (YFMS) | 40-60% | 17% | 22% | 4% |
| Stem exclusion open canopy (SEOC) | 0-5% | 21% | 13% | 8% |
| Stem exclusion closed canopy (SECC) | 5-25% | 23% | 15% | 8% |
| Understory reinitiation (UR) | 5-25% | 6% | 4% | 1% |
| Stand initiation (SI) | 1-10% | <1% | <1% | <1% |

### Warm Dry Plant Association Group

**Management Zone** – Given no action the species composition in pure ponderosa pine stands would continue to be predominantly ponderosa pine over time, with an increase in abundance of western juniper in the hotter, drier stands. Late seral species in the mixed conifer stands would continue to increase in abundance. The proportion of area below or within the management zone would decrease and in 40 years would only be approximately 4 percent of the area within the Warm Dry PAG (description of how management zones are calculated is described above in the Existing Condition section) (Figure 9).

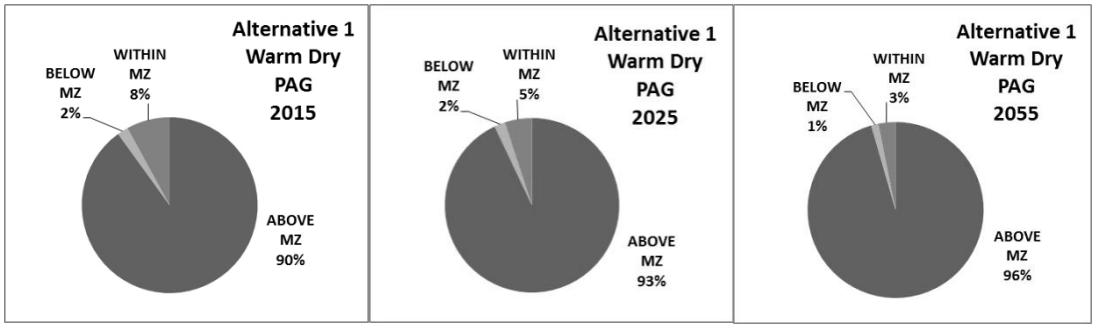


**Figure 9. Warm Dry plant association group (PAG) stand density index under alternative 1 (no action) in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 24 displays how the no action alternative within the Warm Dry PAG compares to HRV through time. Over time old forest multi strata would continue to be above HRV, increasing in abundance to approximately two thirds of the area within the Warm Dry PAG. There is a trend that after 40 years the Warm Dry PAG would be on the lower end of HRV in most young forest structure (YFMS and SEOC) and deficient in SI, decreasing to the lower limit of YFMS and just attaining the lower limit of OFSS. The Warm Dry PAG encompasses approximately 14,233 acres of the project planning area.

**Table 24. Warm Dry plant association group historical range of variability analysis for the no action alternative**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 15-55% | 3% | 3% | 15% |
| Old forest multi strata (OFMS) | 5-20% | 30% | 43% | 66% |
| Young forest multi strata (YFMS) | 5-25% | 21% | 26% | 5% |
| Stem exclusion open canopy (SEOC) | 2-20% | 12% | 7% | 3% |
| Stem exclusion closed canopy (SECC) | 1-10% | 26% | 16% | 10% |
| Understory reinitiation (UR) | 1-10% | 7% | 5% | 1% |
| Stand initiation (SI) | 5-15% | 8% | 0% | 0% |

## Hot Dry Plant Association Group

**Management Zone** – The Hot Dry PAG makes up approximately 3,646 acres in the Magone project planning area. The proportion of area below or within the management zone would decrease and in 40 years would only be approximately 22 percent of the area within the Hot Dry PAG (Figure 10).

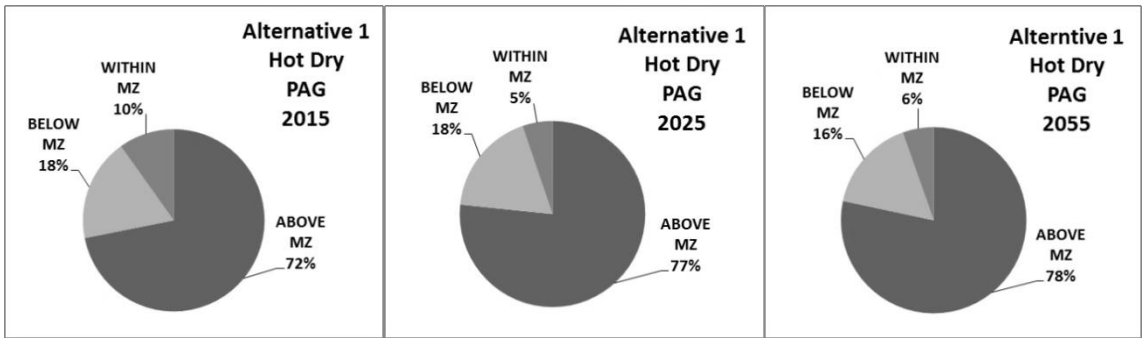


**Figure 10. Hot Dry plant association group (PAG) stand density index under alternative 1 (no action) in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Currently, OFSS is below HRV. While it is projected to increase, the model does not have old forest single stratum increasing to within HRV in 40 years. The model shows young forest and stand initiation to decrease over time. Stem exclusion open canopy stands move toward HRV, but are still well above the historical level (Table 25).

**Table 25. Hot Dry plant association group historical range of variability analysis for the no action alternative**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 20-70% | 2% | 8% | 6% |
| Old forest multi strata (OFMS) | 2-15% | 22% | 27% | 59% |
| Young forest multi strata (YFMS) | 2-20% | 21% | 20% | 1% |
| Stem exclusion open canopy (SEOC) | 5-20% | 51% | 42% | 34% |
| Stem exclusion closed canopy (SECC) | 0-5% | 0% | 0% | 0% |
| Understory reinitiation (UR) | 0-5% | 2% | 1% | <1% |
| Stand initiation (SI) | 5-15% | 2% | 2% | 0% |

### Cool Moist Plant Association Group

**Management Zone** – The Cool Moist PAG makes up about 2,073 acres of the Magone planning area. The proportion of Cool Moist PAG that is within or below the management zone decreases from 6 to 1 percent of the PAG by 2025 (Figure 11).

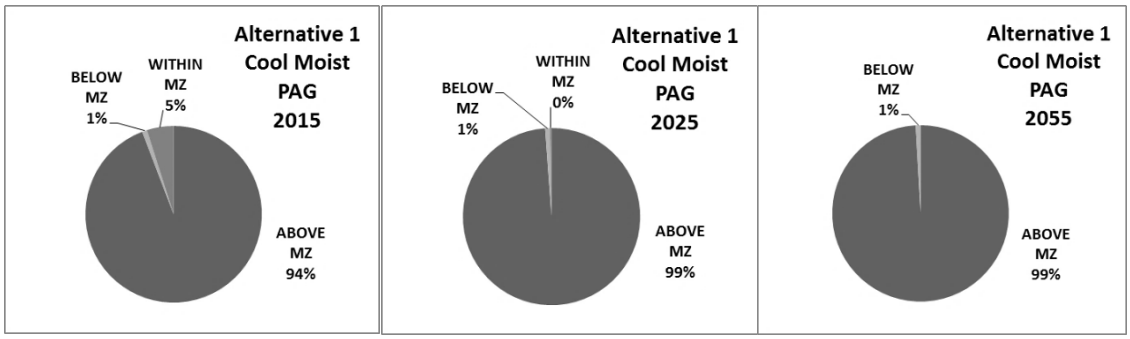


**Figure 11. Cool Moist plant association group (PAG) stand density index under alternative 1 (no action) in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Currently, old forest single stratum is double the upper range of HRV. Over time, the model has old forest single stratum moving in and out of HRV. Old forest multi strata, however exceeds the historical level, and keeps increasing over time. The younger strata decrease over time, with young forest multi strata and understory reinitiation moving below HRV (Table 26).

**Table 26. Cool Moist plant association group historical range of variability analysis for the no action alternative**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 10% | 1% | 7% |
| Old forest multi strata (OFMS) | 10-30% | 48% | 61% | 84% |
| Young forest multi strata (YFMS) | 40-60% | 3% | 18% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 12% | 5% | 3% |
| Stem exclusion closed canopy (SECC) | 5-25% | 24% | 13% | 5% |
| Understory reinitiation (UR) | 5-25% | 1% | 1% | 0 |
| Stand initiation (SI) | 1-10% | 1% | 1% | 1% |

### Cold Dry Plant Association Group

**Management Zone** – The Cold Dry PAG makes up about 1,007 acres of the project planning area and currently is 98 percent above the management zone. That percentage increases over the next 40 years, with a small amount remaining within the management zone (Figure 12).

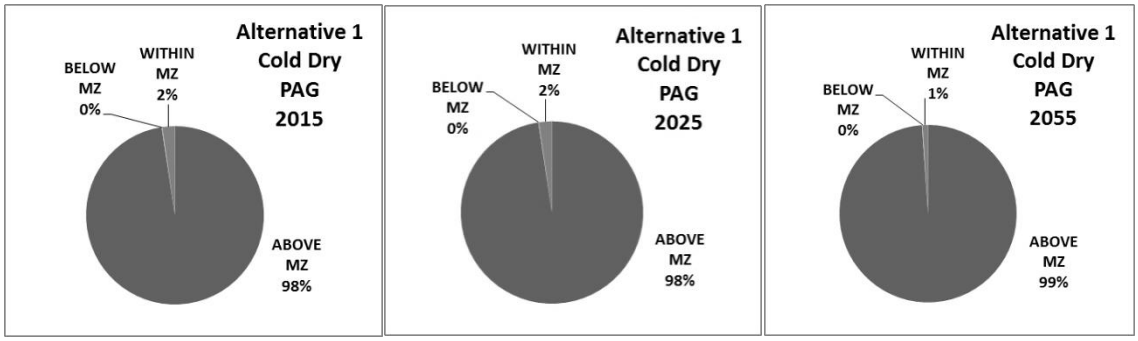


**Figure 12. Cold Dry plant association group (PAG) stand density index under alternative 1 (no action) in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – The structures represented in the Cold Dry PAG represents only approximately 4 percent of the total Magone planning area, at around 1,000 acres. The overall trend of old forest structure (OFSS and OFMS) is to increase above HRV, while at the same time most of the other strata are moving into, or closer to the historical levels (Table 27).

**Table 27. Cold Dry plant association group historical range of variability analysis for the no action alternative**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 10-40% | 13% | 22 | 55 |
| Old forest multi strata (OFMS) | 0-5% | 1% | 9 | 18 |
| Young forest multi strata (YFMS) | 10-40% | 3% | 3 | 10 |
| Stem exclusion open canopy (SEOC) | 0-5% | 34% | 17 | 1 |
| Stem exclusion closed canopy (SECC) | 5-20% | 36% | 23 | 6 |
| Understory reinitiation (UR) | 5-25% | 13% | 21 | 4 |
| Stand initiation (SI) | 1-20% | 0.1% | 0 | 6 |

## Warm Moist Plant Association Group

**Management Zone** – The Warm Moist PAG makes up about 2,242 acres of the Magone project planning area. The Warm Moist PAG starts with 10 percent of the 2,200 acres within or below the management zone. This area decreases over time until there is only approximately 4 percent within or below the management zone (Figure 13).

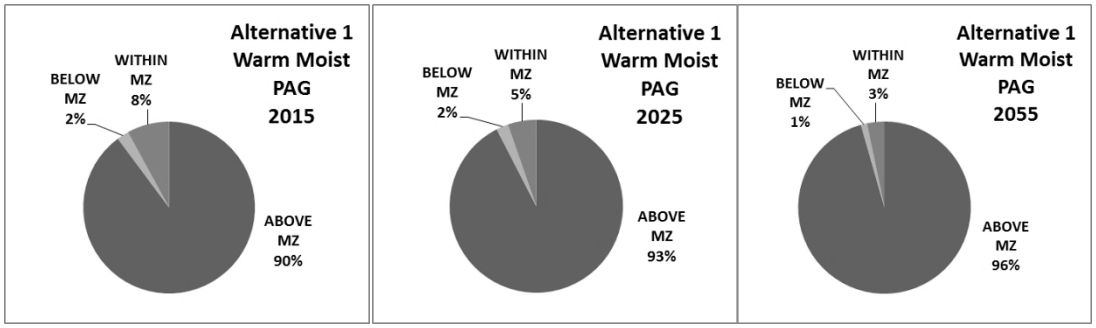


**Figure 13. Warm Moist plant association group (PAG) stand density index under alternative 1 (no action) in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – The Warm Moist plant association groups make up about 2,242 acres of the project planning area, or about 8 percent. While currently the old forest structure (OFSS and OFMS) are within HRV, the FVS modeling shows those strata increasing to double and triple HRV, and younger forest strata going below the historical levels (Table 28.).

**Table 28. Warm Moist plant association group historical range of variability analysis for the no action alternative**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 2% | 5% | 17% |
| Old forest multi strata (OFMS) | 10-30% | 25% | 45% | 64% |
| Young forest multi strata (YFMS) | 20-50% | 4% | 7% | 1% |
| Stem exclusion open canopy (SEOC) | 0-5% | 36% | 15% | 3% |
| Stem exclusion closed canopy (SECC) | 5-20% | 31% | 26% | 14% |
| Understory reinitiation (UR) | 5-20% | 2% | 2% | 1% |
| Stand initiation (SI) | 1-15% | 0.5% | 0 | 0% |

### Effects within the Nipple Butte Inventoried Roadless Area

Without entering the Nipple Butte Inventoried Roadless Area (IRA), many acres of overstocked forest would be left unmanaged. Previous fire suppression and other activities have led to encroachment of species that would have been regularly thinned naturally with fire suppression. Both in and out of the IRA, this has led to stocking levels and species different to what would have occurred historically.

Sixty (60) percent of the old forest structure (OFSS and OFMS) within the project planning area is within the Nipple Butte IRA. In the Hot Dry and Warm Dry plant association groups (PAGs), which cover 66 percent of the project planning area, if no actions are taken, those PAGs would double their current range, increasing overstocking in old forest types, which might lead to these areas having a greater chance of uncharacteristic wildfire or insect infestation. Younger structural stages would decrease over time in the Warm Dry and Hot Dry PAGs, decreasing to below HRV.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with OFSS moving in and out of HRV, OFMS exceeding HRV and increasing over time, and the younger strata decreasing over time (with YFMS and UR moving below HRV).

### Summary of Effects

The existing condition in 2015 has 88 percent of the area above the preferred management zone. With no action, stocking levels will increase to the point that in 2055, 99 percent of the forested areas in the project planning area would be above the preferred management zone.

Currently, the project planning area is within HRV for old forest structure (OFSS and OFMS) for all of the PAGs analyzed above. The Magone project planning area is below HRV in the younger forest structures, and that range is predicted to depart further from HRV over time.

The species composition would continue to diverge from historically early seral species such as ponderosa pine, and late seral species such as grand fir would continue to compete with those early seral species. There would be no activities to increase existing aspen stand vigor. The aspen would continue to have conifers encroaching and large herbivore browsing, inhibiting the ability of aspen to expand.

In the no action alternative, there would be no wood products or forest restoration activities to provide jobs in the local communities.

#### *Cumulative Effects*

Because there are no direct or indirect effects from taking no action, the only cumulative effects would occur as part of the 18 Road Project, and possibly part of the Camp Lick Project. The effects from past practices, which include timber harvesting, fire suppression, grazing, wildfire, and planting, have created predominantly young, overstocked stands of late seral species that currently persist across the project planning area. Taking no action to reduce density or shift species composition through either mechanical methods or prescribed burning in this project keeps the area on its current trajectory and increases the risk or large-scale, stand-replacement fire and epidemic insect outbreaks.

### 3.2.1.6 Alternative 2 – Proposed Action

#### *Design Criteria and Mitigation Measures*

The vegetation and prescribed fire design criteria will be included in the silviculture prescription. This prescription will include a discussion of the general tree selection guidelines, a detailed discussion of each mechanical treatment method, and their respective selection guidelines, and a detailed discussion of the prescribed burning with mortality guidelines. There would be some thinning around the Magone Lake recreation area that would require borax treatments on both pine and fir stumps (Schmitt 2001). Outside of the Magone Lake recreation area, there would be approximately 410 acres of borax treatment. Areas of plantations would be thinned and piled, and piles burned, before any additional prescribed fire is introduced into those stands. Treatments in the old forest multi strata would move it toward old forest single stratum.

#### *Direct and Indirect Effects*

Alternative 2 proposes to mechanically treat approximately 11,872 acres of upland forest, as well as prescribed burn up to 28,500 acres. Mechanical treatments include commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal.

Approximately 54 miles of new trails are proposed for this alternative. The proposed trails would not affect the forest vegetation in the area. The trails would go around existing trees, and would affect a negligible number of acres out of the whole Magone project planning area. The activities in and around the lake would have little impact on the existing conditions, as they would replace or improve existing features. Trailhead development and interpretive signs would be put in place after any harvest, thinning or burning activities, so would have little or no impact on proposed activities.

Impacts from Magone Lake restoration activities (fish sticks and cribs) would have little impact on proposed harvest activities. Some of the material removed from locations near Magone Lake would be used for the fish sticks and cribs, removing some of the downed fuel left from the harvest.

Impacts from road activities would be minimal in the harvest areas. Mostly existing road beds would be used to avoid major impacts to the vegetation and soils in the area.

Given these treatments, stand structure would shift with the proportion of young forest structure decreasing and the proportion of old forest structure increasing over 40 years. When comparing old forest structure after 40 years to the no action alternative, achieves something closer to the historical range of variability (HRV).

**Figure 14. Examples of post-activity landscape**

### Warm Dry Plant Association Group

**Management Zone** – Alternative 2 proposes to mechanically treat 22 percent of the Warm Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Grand fir in the mixed conifer would predominantly be removed during mechanical treatments, and most natural grand fir regeneration would be killed with prescribed fire. Collectively, these treatments would reduce the proportion of the Warm Dry PAG that is above the management zone, bringing it down to approximately 60 percent in 2025 (Figure 16), compared to over 90 percent in 2025 in alternative 1 (no action). The proportion of area within the management zone would increase from 11 percent up to about 16 percent (Figure 15).

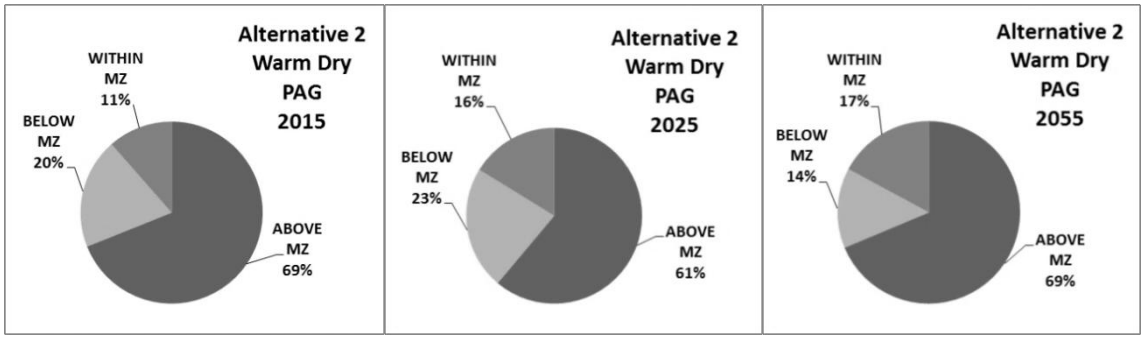


**Figure 15. Warm Dry plant association group (PAG) stand density index under alternative 2 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 29 shows how alternative 2 within the Warm Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to a little over one third of the area, and OFSS would increase to be well within HRV. There is a trend that after 40 years, the Warm Dry PAG would be deficient in young forest structure (SI and YFMS). However, alternative 2 increases the proportion of OFSS over time.

**Table 29. Warm Dry plant association group historical range of variability analysis for alternative 2**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 15-55% | 3% | 13% | 31% |
| Old forest multi strata (OFMS) | 5-20% | 30% | 28% | 43% |
| Young forest multi strata (YFMS) | 5-25% | 21% | 3% | 1% |
| Stem exclusion open canopy (SEOC) | 2-20% | 12% | 22% | 14% |
| Stem exclusion closed canopy (SECC) | 1-10% | 26% | 26% | 8% |
| Understory reinitiation (UR) | 1-10% | 7% | 5% | 1% |
| Stand initiation (SI) | 5-15% | 1% | 3% | 2% |

### Hot Dry Plant Association Group

**Management Zone** – Alternative 2 proposes to mechanically treat 49 percent of the Hot Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Collectively, these treatments would reduce the proportion of the Hot Dry PAG that is above the management zone, bringing it down to less than 50 percent in 2025 (Figure 16), compared to over 80 percent in 2025 in alternative 1 (no action).

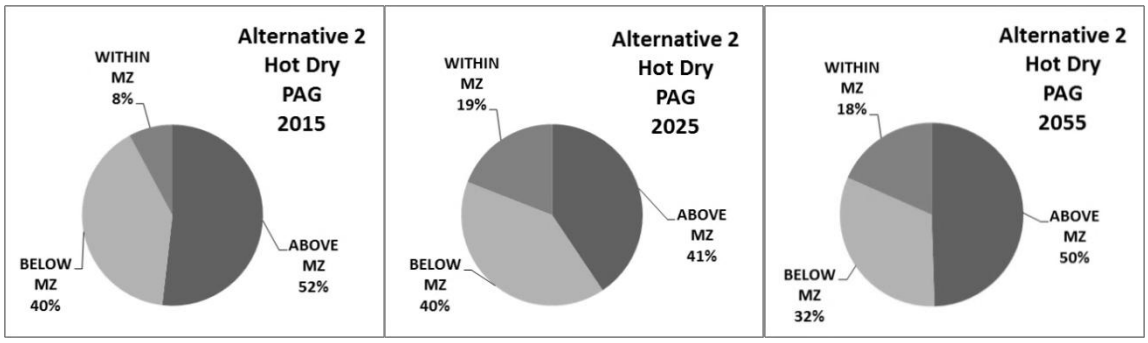


**Figure 16. Hot Dry plant association group (PAG) stand density index under alternative 2 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 30 shows how alternative 2 within the Hot Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to a little over one third of the area, and OFSS would increase to be well within HRV. There is a trend that after 40 years, the Hot Dry PAG would be deficient in young forest structure (YFMS); in contrast SI would increase to be above HRV. However, alternative 2 increases the proportion of OFSS over time, and moves it into HRV in 40 years.

**Table 30. Hot Dry plant association group historical range of variability analysis for alternative 2**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 20-70% | 2% | 14% | 23% |
| Old forest multi strata (OFMS) | 2-15% | 22% | 17% | 32% |
| Young forest multi strata (YFMS) | 2-20% | 21% | 2% | <1% |
| Stem exclusion open canopy (SEOC) | 5-20% | 51% | 41% | 22% |
| Stem exclusion closed canopy (SECC) | 0-5% | 0% | 0% | 0% |
| Understory reinitiation (UR) | 0-5% | 2% | 1% | 0% |
| Stand initiation (SI) | 5-15% | 2% | 25% | 23% |

### Cool Moist Plant Association Group

**Management Zone** – Alternative 2 proposes to mechanically treat 31 percent of the Cool Moist PAG in the Magone project planning area, which is less than 10 percent of the total Magone project planning area, and prescribe burn approximately 70 percent of the Cool Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly early seral over time. Since only a small portion of the Cool Moist PAG area would be mechanically treated, the untreated areas would remain predominantly late seral species. The treatments would change the area from being over 95 percent above the management zone in the no action alternative in 2025, to only 57 percent above the management zone under alternative 2 in 2025 (Figure 17).

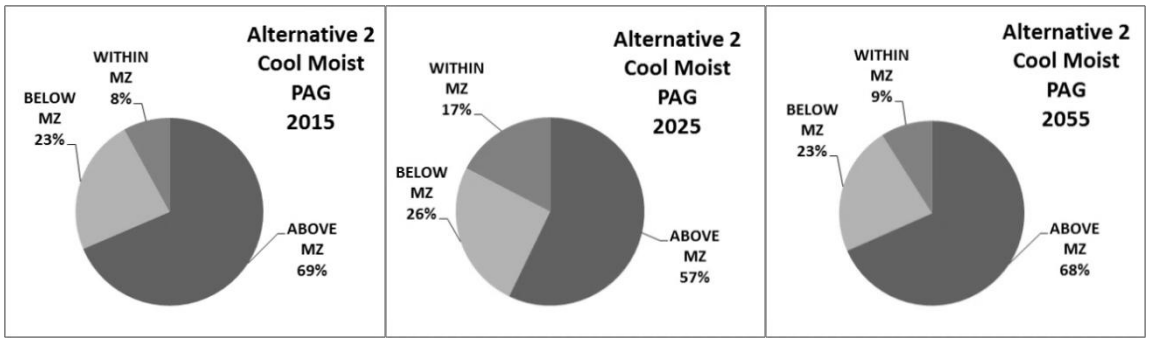


**Figure 17. Cool Moist plant association group (PAG) stand density index under alternative 2 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 31 shows how alternative 2 within the Cool Moist PAG compares to HRV through time. Over time OFMS would continue to be above HRV, although it does decrease to a small degree over 40 years. OFSS would increase to be well above the HRV. There is a trend that after 40 years, the Cool Moist PAG would be deficient in young forest structure (SI and YFMS).

**Table 31. Cool Moist plant association group historical range of variability analysis for alternative 2**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 10% | 19% | 45% |
| Old forest multi strata (OFMS) | 10-30% | 48% | 43% | 47% |
| Young forest multi strata (YFMS) | 40-60% | 3% | 1% | 1% |
| Stem exclusion open canopy (SEOC) | 0-5% | 13% | 20% | 5% |
| Stem exclusion closed canopy (SECC) | 5-25% | 24% | 13% | 0% |
| Understory reinitiation (UR) | 5-25% | 0.5% | 0% | 0% |
| Stand initiation (SI) | 1-10% | 1% | 4% | 2% |

## Cold Dry Plant Association Group

**Management Zone** – Alternative 2 proposes to mechanically treat 53 percent of the Cold Dry PAG in the Magone project planning area. The Cold Dry PAG makes up only about 1,000 acres of the total Magone project planning area, so only about 1 percent of the Magone project planning area is included in the Cold Dry PAG. Currently, more than 60 percent of the Cold Dry PAG is stocked higher than the management zone. With the proposed treatments, the species composition in these stands would continue to be predominantly lodgepole pine due to the prolific nature of the species. However, other species that exist in these stands, including western larch and ponderosa pine, would be left to grow and provide for natural regeneration. In the mixed conifer stands late seral species would predominantly be removed during mechanical treatments and some natural regeneration would be killed with prescribed burning. The activities proposed would decrease the proportion of the Cold Dry PAG that is above the management zone to approximately 46 percent in 2025 (Figure 18), compared to over 90 percent above the management zone in 2025 under alternative 1 (no action).

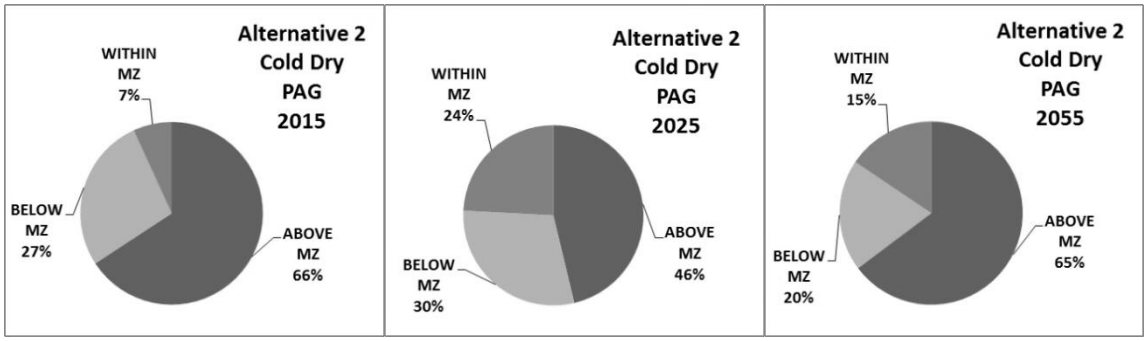


**Figure 18. Cold Dry plant association group (PAG) stand density index under alternative 2 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 32 shows how alternative 2 within the Cold Dry PAG compares to HRV through time. Over time OFMS would continue to be within HRV, increasing in abundance, and OFSS would increase to be well above HRV. There is a tendency that after 40 years, the Cold Dry PAG would be deficient in young forest structure (SI and YFMS). However, alternative 2 increases the proportion of OFSS over time.

**Table 32. Cold Dry plant association group historical range of variability analysis for alternative 2**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 10-40% | 13% | 22% | 64% |
| Old forest multi strata (OFMS) | 0-5% | 1% | 1% | 5% |
| Young forest multi strata (YFMS) | 10-40% | 3% | 0% | 3% |
| Stem exclusion open canopy (SEOC) | 0-5% | 34% | 59% | 4% |
| Stem exclusion closed canopy (SECC) | 5-20% | 36% | 10% | 1% |
| Understory reinitiation (UR) | 5-25% | 13% | 0% | 0% |
| Stand initiation (SI) | 1-20% | <1% | 8% | 12% |

### Warm Moist Plant Association Group

**Management Zone** – Alternative 2 proposes to mechanically treat 35 percent of the Warm Moist PAG in the Magone project planning area, and prescribe burn approximately 85 percent of the Warm Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine over time. Prescribed burning would likely stimulate shrub recruitment in this PAG as well. Under the no action alternative, over 90 percent of the stands would be above the management zone in 2025. Alternative 2 decreases the percentage of acres above the management zone to about 64 percent in 2025 (Figure 19).

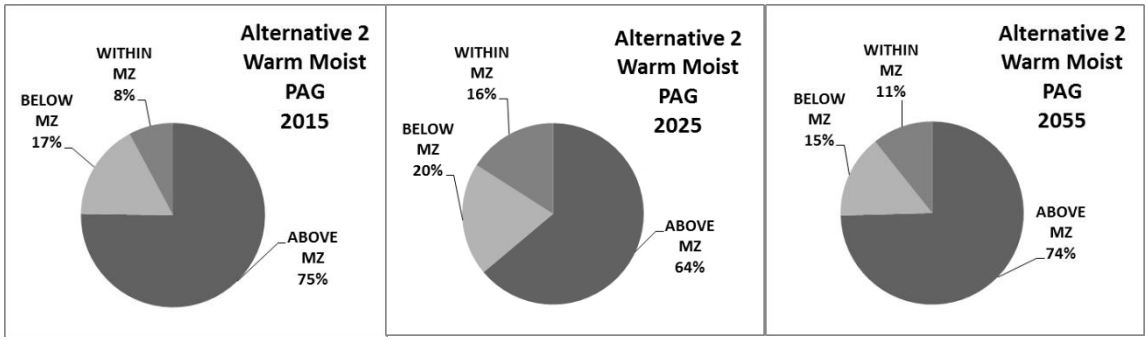


**Figure 19. Warm Moist plant association group (PAG) stand density index under alternative 2 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 33 shows how alternative 2 within the Warm Moist PAG compares to HRV through time. Over time OFMS would rise to be above HRV, increasing in abundance to a little over one third of the area, and OFSS would increase to slightly above HRV. There is a tendency that after 40 years, the Warm Moist PAG would be deficient in YFMS, and SI would increase slightly, but stay on the lower end of HRV.

**Table 33. Warm Moist plant association group historical range of variability analysis for alternative 2**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 2% | 17% | 35% |
| Old forest multi strata (OFMS) | 10-30% | 25% | 29% | 36% |
| Young forest multi strata (YFMS) | 20-50% | 4% | 3% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 36% | 27% | 21% |
| Stem exclusion closed canopy (SECC) | 5-20% | 31% | 21% | 3% |
| Understory reinitiation (UR) | 5-20% | 2% | 0% | 0% |
| Stand initiation (SI) | 1-15% | <1% | 3% | 5% |

### Effects within the Nipple Butte Inventoried Roadless Area

As described above, the majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV and young forest structure decreasing to be below or on the lower end of HRV.

### Summary of Effects

The activities planned under alternative 2 would bring a portion of the project planning area to within or below the management zone. When compared to the no action alternative of 99 percent being above the management zone in 2055, alternative 2 would bring more of the acreage within or below the management zone, leaving only 63 percent above the management zone.

Currently, overall, the project planning area is within HRV for old forest structure (OFSS and OFMS) for all of the PAGs analyzed above. OFSS and OFMS would increase to be within or above HRV in 2055 in all PAGs. Young forest structure would mostly be below or on the lower end of HRV in 2055, except for in the Hot Dry and Cold Dry PAGs where SI would increase to be well within or above HRV in 2055.

Alternative 2 would begin restoration of historical early seral species composition in the areas that are treated. Conifer removal in aspen stands would decrease competition and increase vigor within those areas. Thinning of conifers, including juniper where it has encroached, would restore those areas to a more historical composition of vegetation.

Alternative 2 would provide 14 MMBF to the local community in forest products and provide jobs associated with the harvest and manufacture of those forest products, as well as jobs in the restoration activities planned.

### *Cumulative Effects*

The effects from past practices, which include timber harvesting, fire suppression, grazing, wildfire, and planting, have created predominantly young, overstocked stands of late seral species that currently persist across the project planning area.

Implementing the mechanical methods and prescribed burning of alternative 2 would reduce density and shift species composition of the treated stands in predominantly the mid and old forest stands in all of the PAGs. Stands that are not treated would continue on the current trajectory as defined in the no action alternative.

The Plantation Maintenance and County Road 18 projects are current actions that would reduce stand density and shift species composition of the young, stand initiation stands on approximately 100 acres within the Magone project planning area. Aquatic Restoration Decision activities would shift species composition in some areas, and provide material for streambed improvements in other areas. Cumulatively, alternative 2 activities, plantation maintenance, Aquatic Restoration Decision activities, and the County Road 18 Project would be widespread enough to reduce the risk of large-scale, stand replacement fire and epidemic insect outbreak in all forest structural stages in all PAGs across the project planning area, but would need further treatments in the future to keep progressing toward HRV.

The actions within the Magone project planning area, recent County Road 18 Project activities that are in various stages of completion and within directly adjacent subwatersheds, Aquatic Restoration Decision activities, and the potential actions in the Camp Lick Project would cumulatively have an effect on portions of the Grub Creek and East Fork Beech Creek drainages. These actions combined would decrease stand density, shift species composition to a larger proportion of early seral species, and move stand structure towards HRV to decrease stocking and fuels levels, to help reduce the risk of large-scale, stand replacement fire and epidemic insect outbreaks in the Grub Creek and East Fork Beech Creek subwatersheds. Alternative 2 includes mechanically treating approximately 11,872 acres. The Camp Lick project planning area is approximately 40,000 acres. Recent projects on the Blue Mountain Ranger District have mechanically thinned approximately 25 percent of the project planning area, which would be approximately 10,000 acres for the Camp Lick project. Some riparian improvement activities will be completed under the Aquatic Restoration Decision. Together, these projects would mechanically thin approximately 35 percent of the cumulative effects analysis area over an approximately 15 year time period.

### 3.2.1.7 Alternative 3

#### *Design Criteria and Mitigation Measures*

The vegetation and prescribed fire design criteria will be included in the silviculture prescription. This prescription will include a discussion of the general tree selection guidelines, a detailed discussion of each mechanical treatment method, and their respective selection guidelines, and a detailed discussion of the prescribed burning with mortality guidelines. There would be some thinning around the Magone Lake recreation area that would require borax treatments on both pine and fir stumps (Schmitt 2001). Outside the Magone Lake recreation area, there would be approximately 1,070 acres of borax treatment. Areas of plantations would be thinned and piled, and piles burned, before any additional prescribed fire is introduced into those stands. Treatments in the OFMS would move it toward OFSS.

#### *Direct and Indirect Effects*

Alternative 3 proposes to mechanically treat approximately 13,378 acres of upland forest, as well as prescribe burn up to 28,500 acres. Mechanical treatments include commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal.

Approximately 96.3 miles of new trails are proposed under this alternative. The proposed trails would not affect the forest vegetation in the area. The trails would go around existing trees and would affect a negligible number of acres out of the whole Magone project planning area. The activities in and around the lake would have little impact on the existing conditions, as they would replace or improve existing features. Trailhead development and interpretive signs would be put in place after any harvest, thinning or burning activities, so would have little or no impact on proposed activities.

Impacts from Magone Lake restoration activities (fish sticks and cribs) would have little impact on proposed harvest activities. Some of the material removed from locations near Magone Lake would be used for the fish sticks and cribs, removing some of the downed fuel left from the harvest.

Impacts from road activities would be minimal in the harvest areas. Mostly existing road beds would be used to avoid major impacts to the vegetation and soils in the area.

Given these treatments, stand structure would shift with the proportion of young forest structure decreasing and the proportion of old forest structure increasing over 40 years. When comparing old forest structure after 40 years to the no action alternative, alternative 3 creates less than the no action alternative, but achieves something closer to the historical range of variability, including a 5 percent increase in stand initiation. There is a decrease over time of young forest with a multistory component.

### Warm Dry Plant Association Group

**Management Zone** – Alternative 3 proposes to mechanically treat 45 percent of the Warm Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Grand fir in the mixed conifer would predominantly be removed during mechanical treatments, and most natural grand fir regeneration would be killed with prescribed fire. Collectively, these treatments would reduce the proportion of the Warm Dry PAG that is above the management zone, bringing it down to approximately 50 percent in 2025 (Figure 21), compared to over 90 percent in 2025 under alternative 1 (no action). The level within the management zone increases from about 14 percent to 18 percent in 2025 (Figure 20).

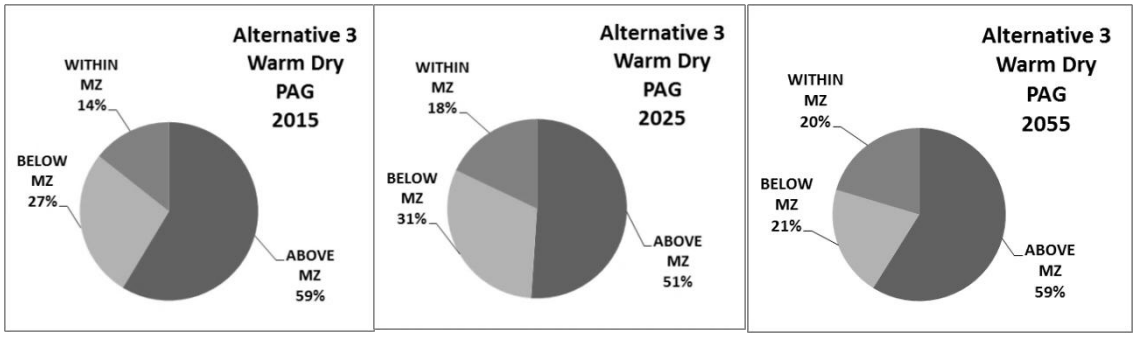


**Figure 20. Warm Dry plant association group (PAG) stand density index under alternative 3 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 34 shows how alternative 3 within the Warm Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to a little over one third of the area, and OFSS would increase to be well within HRV. There is a trend that shows after 40 years, the Warm Dry PAG would be deficient in young forest structure (SI and YFMS). However, alternative 3 increases the proportion of OFSS over time.

**Table 34. Warm Dry plant association group historical range of variability analysis for alternative 3**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 15-55% | 3% | 26% | 37% |
| Old forest multi strata (OFMS) | 5-20% | 30% | 25% | 34% |
| Young forest multi strata (YFMS) | 5-25% | 21% | 2% | 1% |
| Stem exclusion open canopy (SEOC) | 2-20% | 12% | 29% | 17% |
| Stem exclusion closed canopy (SECC) | 1-10% | 26% | 21% | 8% |
| Understory reinitiation (UR) | 1-10% | 7% | 3% | 0% |
| Stand initiation (SI) | 5-15% | <1% | 4% | 3% |

### Hot Dry Plant Association Group

**Management Zone** – Alternative 3 proposes to mechanically treat 53 percent of the Hot Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Grand fir in the mixed conifer would predominantly be removed during mechanical treatments, and most natural grand fir regeneration would be killed with prescribed fire. Collectively, these treatments would reduce the proportion of the Hot Dry PAG that is above the management zone, bringing it down to less than 40 percent in 2025 (Figure 21), compared to over 70 percent in 2025 under alternative 1 (no action).

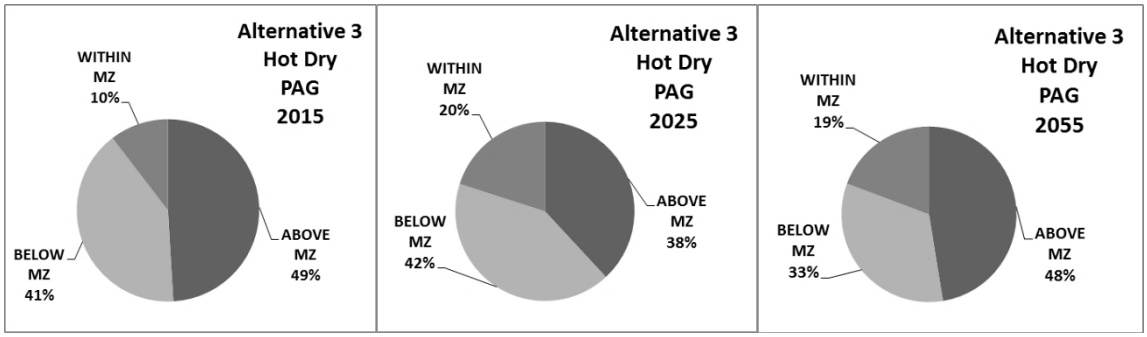


**Figure 21. Hot Dry plant association group (PAG) stand density index under alternative 3 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 35 shows how alternative 3 within the Hot Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to almost one third of the area, and OFSS would increase to be well within HRV. There is a trend that after 40 years, the Hot Dry PAG would be deficient in YFMS structure. However, alternative 3 increases the proportion of OFSS over time and moves it into HRV in 40 years, increases SI structure, and decreases SEOC to be closer to HRV.

**Table 35. Hot Dry plant association group historical range of variability analysis for alternative 3**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 20-70% | 2% | 15% | 27% |
| Old forest multi strata (OFMS) | 2-15% | 22% | 15% | 28% |
| Young forest multi strata (YFMS) | 2-20% | 21% | 1% | 0% |
| Stem exclusion open canopy (SEOC) | 5-20% | 51% | 43% | 23% |
| Stem exclusion closed canopy (SECC) | 0-5% | 0% | 0% | 0% |
| Understory reinitiation (UR) | 0-5% | 2% | 1% | 0% |
| Stand initiation (SI) | 5-15% | 2% | 25% | 22% |

## Cool Moist Plant Association Group

**Management Zone** – Alternative 3 proposes to mechanically treat 36 percent of the Cool Moist PAG in the Magone project planning area (the Cool Moist PAG represents less than 10 percent of the total Magone project planning area) and prescribe burn approximately 70 percent of the Cool Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly early seral over time. Since only a small portion of the Cool Moist PAG is being mechanically treated, the untreated areas would remain predominantly late seral species. The treatments would change the area from being over 95 percent above the management zone under the no action alternative in 2025, to only 43 percent above management zone under alternative 3 in 2025 (Figure 22).

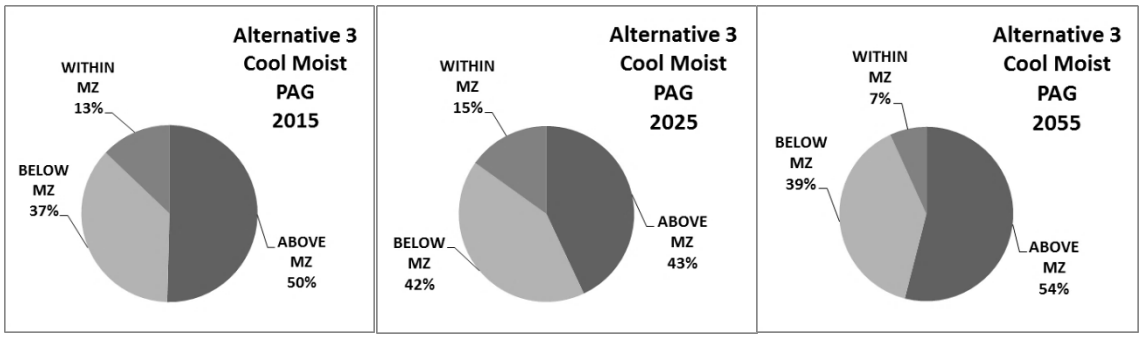


**Figure 22. Cool Moist plant association group (PAG) stand density index under alternative 3 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 36 shows how alternative 3 within the Cool Moist PAG compares to HRV through time. Over time OFMS would continue to be above HRV, although it does decrease to a small degree over 40 years. OFSS would increase to be well above HRV. There is a trend that after 40 years, the Cool Moist PAG would be deficient in young forest structure (SI and YFMS).

**Table 36. Cool Moist plant association group historical range of variability analysis for alternative 3**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 10% | 29% | 56% |
| Old forest multi strata (OFMS) | 10-30% | 48% | 32% | 34% |
| Young forest multi strata (YFMS) | 40-60% | 3% | 1% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 13% | 4% | 8% |
| Stem exclusion closed canopy (SECC) | 5-25% | 24% | 10% | 0% |
| Understory reinitiation (UR) | 5-25% | <1% | 0% | 0% |
| Stand initiation (SI) | 1-10% | 1% | 7% | 2% |

### Cold Dry Plant Association Group

**Management Zone** – Alternative 3 proposes to mechanically treat 69 percent of the Cold Dry PAG in the Magone project planning area. The Cold Dry PAG makes up only about 1,000 acres of the total Magone project planning area, so only about 1 percent of the Magone project planning area is included in the Cold Dry PAG. Currently, the Cold Dry PAG is about 60 percent overstocked. Given these actions, the species composition in these stands would continue to be predominantly lodgepole pine due to the prolific nature of the species. However, other species that exist in these stands, including western larch and ponderosa pine, would be left to grow and provide for natural regeneration. In the mixed conifer stands, late seral species would predominantly be removed during mechanical treatments and some natural regeneration would be killed with prescribed burning. The activities proposed would decrease the proportion of the Cold Dry PAG that is above the management zone to approximately 39 percent in 2025 (Figure 23), compared to over 90 percent above the management zone in 2025 under alternative 1 (no action).

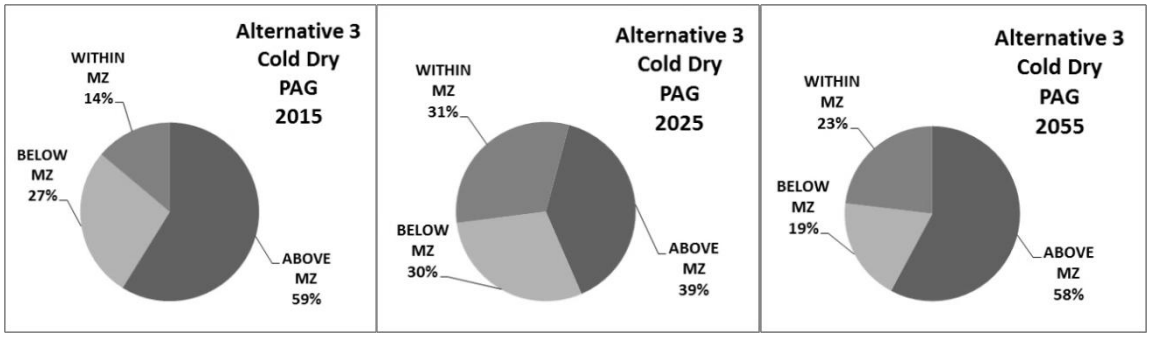


**Figure 23. Cold Dry plant association group (PAG) stand density index under alternative 3 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 37 shows how alternative 3 within the Cold Dry PAG compares to HRV through time. Over time OFMS would continue to be within HRV, increasing in abundance, and OFSS would increase to be well above HRV. There is a tendency that after 40 years, the Cold Dry PAG would be deficient in YFMS. SI would increase and stay within HRV. Alternative 3 shows an increase in the proportion of OFSS over time.

**Table 37. Cold Dry plant association group historical range of variability analysis for alternative 3**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 10-40% | 13% | 22% | 57% |
| Old forest multi strata (OFMS) | 0-5% | 1% | 2% | 5% |
| Young forest multi strata (YFMS) | 10-40% | 3% | 0% | 4% |
| Stem exclusion open canopy (SEOC) | 0-5% | 34% | 58% | 14% |
| Stem exclusion closed canopy (SECC) | 5-20% | 3% | 10% | 1% |
| Understory reinitiation (UR) | 5-25% | 13% | 0% | 0% |
| Stand initiation (SI) | 1-20% | <1% | 8% | 19% |

### Warm Moist Plant Association Group

**Management Zone** – Alternative 3 proposes to mechanically treat 45 percent of the Warm Moist PAG in the Magone project planning area, and prescribe burn approximately 85 percent of the Warm Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine over time. Prescribed burning would likely stimulate shrub recruitment in these PAGs as well. Under the no action alternative, over 90 percent of the stands would be above the management zone in 2025; alternative 3 lowers that to about 55 percent in 2025 (Figure 24).

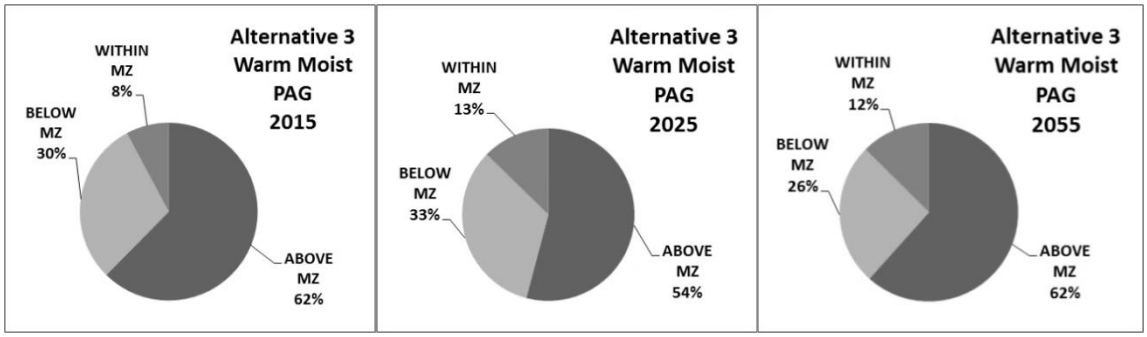


**Figure 24. Warm Moist plant association group (PAG) stand density index under alternative 3 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 38 shows how alternative 3within the Warm Moist PAG compares to HRV through time. Over time OFMS stays static, and OFSS would increase to above HRV. There is a tendency that after 40 years, the Warm Moist PAG would be deficient in YFMS, and SI would increase slightly, but stay on the lower end of HRV. Alternative 3 increases the proportion of OFSS over time.

**Table 38. Warm Moist plant association group historical range of variability analysis for alternative 3**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 2% | 21% | 40% |
| Old forest multi strata (OFMS) | 10-30% | 25% | 25% | 24% |
| Young forest multi strata (YFMS) | 20-50% | 3% | 3% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 36% | 32% | 27% |
| Stem exclusion closed canopy (SECC) | 5-20% | 31% | 15% | 4% |
| Understory reinitiation (UR) | 5-20% | 2% | 0% | 0% |
| Stand initiation (SI) | 1-15% | <1% | 4% | 5% |

### Effects within the Nipple Butte Inventoried Roadless Area

As described above, the majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055, similar to what would be seen under alternative 2.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV, with more OFSS and less OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2.

### Summary of Effects

The activities planned under alternative 3 would bring a portion of the project planning area to within or below the management zone. When compared to the no action alternative of 99 percent being above the management zone in 2055, alternative 3 would bring more of the acreage to within or below that management zone, with only 54 percent above the management zone.

Currently, overall, the project planning area is within HRV for old forest structure (OFSS and OFMS) for all of the PAGs analyzed above. Within the Warm Dry, Hot Dry, Cool Moist, and Warm Moist PAGs, old forest structure (OFSS and OFMS) would increase to be within or above HRV in 2055, increasing more in OFSS and less in OFMS than under alternative 2. In the Cold Dry PAG, old forest structure would increase to be within or above HRV in 2055, increasing less in OFSS and the same amount in OFMS compared to alternative 2. Young forest structure would mostly be below or on the lower end of HRV in 2055, except for in the Hot Dry and Cold Dry PAGs where SI would increase to be well within or above HRV in 2055 (similar to what would be seen under alternative 2.

Alternative 3 would begin restoration of historical early seral species composition in the areas that are treated. Conifer removal in aspen stands would decrease competition and increase vigor within those areas. Thinning of conifers, including juniper where it has encroached, would restore those areas to a more historical composition of vegetation.

Alternative 3 would provide 16 MMBF to the local community in forest products and provide jobs associated with harvest and manufacture of those forest products, as well as jobs in the restoration activities planned.

#### *Cumulative Effects*

The effects from past practices, which include timber harvesting, fire suppression, grazing, wildfire, and planting, have created predominantly young, overstocked stands of late seral species that currently persist across the project planning area. Implementing the mechanical methods and prescribed burning of alternative 3 would reduce density and shift species composition of the treated stands in predominantly the mid and old forest stands in all of the PAGs. Stands that are not treated would continue on the current trajectory as defined in the no action alternative.

The Plantation Maintenance and County Road 18 projects are current actions that would reduce stand density and shift species composition of the young, stand initiation stands on approximately 100 acres within the Magone project planning area. Aquatic Restoration Decision activities would shift species composition in some areas, and provide material for streambed improvements in other areas. Cumulatively, alternative 3 activities, plantation maintenance, Aquatic Restoration Decision activities, and the County Road 18 Project would be widespread enough to reduce the risk of large-scale, stand replacement fire and epidemic insect outbreak in all forest structural stages in all PAGs across the project planning area, but would need further treatments in the future to keep progressing toward HRV.

The actions within the Magone project planning area, recent County Road 18 project activities that are in various stages of completion and within directly adjacent subwatersheds, and the potential actions in the Camp Lick Project would cumulatively have an effect on portions of the Grub Creek and East Fork Beech Creek subwatersheds. These actions combined would decrease stand density, shift species composition to a larger proportion of early seral species, and move stand structure towards HRV to decrease the risk of large-scale, stand-replacement fire and epidemic insect outbreaks in the Grub Creek and East Fork Beech Creek. Alternative 3 includes mechanically treating approximately 13,378 acres. The Camp Lick project planning area is approximately 40,000 acres. Recent projects on the Blue Mountain Ranger District have mechanically thinned approximately 25 percent of the project planning area, which would be approximately 10,000 acres for Camp Lick. Some riparian improvement activities will be completed under the Aquatic Restoration Decision. Together, these projects will mechanically thin approximately 18 percent of the cumulative effects analysis area over an approximate 15-year time period.

### 3.2.1.8 Alternative 4

#### *Design Criteria and Mitigation Measures*

The vegetation and prescribed fire design criteria will be included in the silviculture prescription. This prescription will include a discussion of the general tree selection guidelines, a detailed discussion of each mechanical treatment method, and their respective selection guidelines, and a detailed discussion of the prescribed burning with mortality guidelines. There would be some thinning around the Magone Lake recreation area that would require borax treatments on both pine and fir stumps (Schmitt 2001). As there would be some areas retaining fir as a component of the diverse species, outside the Magone Lake recreation area, there would be approximately 110 acres of borax treatment.

Areas of plantations would be thinned and piled, and piles burned, before any additional prescribed fire is introduced into those stands. Treatments in the OFMS would move it toward OFSS.

### *Direct and Indirect Effects*

Alternative 4 proposes to mechanically treat approximately 5,505 acres of upland forest, as well as prescribed burn up to 17,200 acres. Mechanical treatments include commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal.

Approximately 15.4 miles of new trails are proposed under this alternative. The proposed trails do not affect the forest vegetation in the area. The trails would go around existing trees and would affect a negligible number of acres out of the whole Magone project planning area. The activities in and around the lake would have little impact on the existing conditions, as they would replace or improve existing features. Trailhead development would be put in place after any harvest, thinning or burning activities, and would have little or no impact on proposed activities.

Impacts from Magone Lake restoration activities (fish sticks and cribs) would have little impact on proposed harvest activities. Some of the material removed from locations near Magone Lake would be used for the fish sticks and cribs, removing some of the downed fuel left from the harvest.

Impacts from road activities would be minimal in the harvest areas. Mostly existing road beds would be used to avoid major impacts to the vegetation and soils in the area.

Given these treatments, stand structure would shift; with the proportion of young forest structure decreasing and the proportion of old forest structure increasing over 40 years. When comparing old forest structure after 40 years to the no action alternative, alternative 4 creates less than the no action alternative, but achieves something closer to the historical range of variability. Both alternatives have little stand reinitiation after 40 years.

#### Warm Dry Plant Association Group

**Management Zone** – Alternative 4 proposes to mechanically treat 22 percent of the Warm Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Grand fir in the mixed conifer would predominantly be removed during mechanical treatments and most natural grand fir regeneration would be killed with prescribed fire. Collectively, these treatments would reduce the proportion of the Warm Dry PAG that is above the management zone, bringing it down to approximately 75 percent in 2025 (Figure 26), compared to over 90 percent in 2025 under alternative 1 (no action). The area within the management zone increases from 11 percent to 12 percent (Figure 25). The model shows Alternative 4 having the area within or below the management zone decrease by 2055, leaving 81 percent of the total area above the preferred management zone. This is approximately 15 percent less than the 96 percent forecast at 2055 under the no action alternative in the Warm Dry PAG.

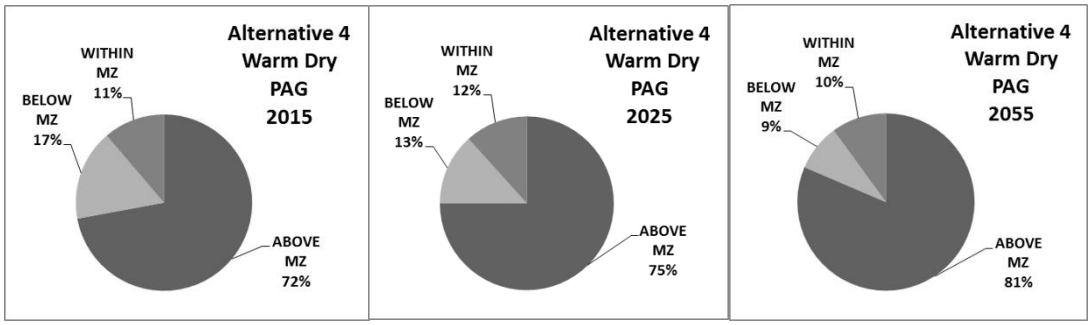


**Figure 25. Warm Dry plant association group (PAG) stand density index under alternative 4 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 39 shows how alternative 4 within the Warm Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to a little over one third of the area, and OFSS would increase to be well within HRV. There is a trend that after 40 years, the Warm Dry PAG would be deficient in young forest structure (SI and YFMS). Alternative 4 increases the proportion of OFSS over time.

**Table 39. Warm Dry plant association group historical range of variability analysis for alternative 4**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 15-55% | 3% | 9% | 23% |
| Old forest multi strata (OFMS) | 5-20% | 30% | 35% | 55% |
| Young forest multi strata (YFMS) | 5-25% | 21% | 16% | 3% |
| Stem exclusion open canopy (SEOC) | 2-20% | 12% | 17% | 8% |
| Stem exclusion closed canopy (SECC) | 1-10% | 26% | 18% | 9% |
| Understory reinitiation (UR) | 1-10% | 7% | 4% | 1% |
| Stand initiation (SI) | 5-15% | 1% | 1% | 1% |

### Hot Dry Plant Association Group

**Management Zone** – Alternative 4 proposes to mechanically treat 15 percent of the Hot Dry PAG in the Magone project planning area. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine with a component of western larch and Douglas-fir. Grand fir in the mixed conifer would predominantly be removed during mechanical treatments and most natural grand fir regeneration would be killed with prescribed fire. These activites would increase the proportion of the Hot Dry PAG that is above the preferred management zone to approximately 74 percent by 2055 (Figure 26). This total would be approximately 4 percent lower than the no action alternative of 78 percent above the management zone in 2055.

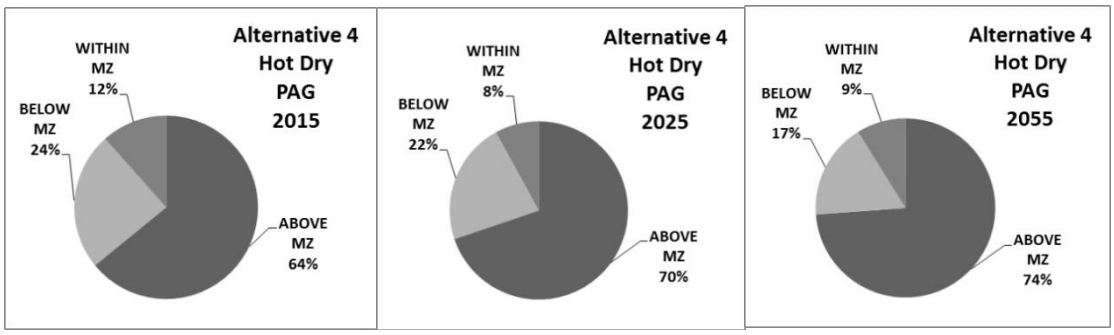


**Figure 26. Hot Dry plant association group (PAG) stand density index under alternative 4 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 40 shows how alternative 4 within the Hot Dry PAG compares to HRV through time. Over time OFMS would continue to be above HRV, increasing in abundance to a little over half of the area, and OFSS would increase to closer to HRV. There is a trend that after 40 years, the Hot Dry PAG would be deficient in young forest structure (SI and YFMS). Alternative 4 increases the proportion of old forest over time, and moves OFSS toward HRV in 40 years.

**Table 40. Hot Dry plant association group historical range of variability analysis for alternative 4**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 20-70% | 2% | 11% | 14% |
| Old forest multi strata (OFMS) | 2-15% | 22% | 23% | 52% |
| Young forest multi strata (YFMS) | 2-20% | 21% | 16% | 1% |
| Stem exclusion open canopy (SEOC) | 5-20% | 51% | 44% | 31% |
| Stem exclusion closed canopy (SECC) | 0-5% | 0% | 0% | 0% |
| Understory reinitiation (UR) | 0-5% | 2% | 1% | 0% |
| Stand initiation (SI) | 5-15% | 2% | 5% | 2% |

### Cool Moist Plant Association Group

**Management Zone** – Alternative 4 proposes to mechanically treat 31 percent of the Cool Moist PAG in the Magone project planning area (which is less than 10 percent of the total Magone project planning area) and prescribe burn approximately 70 percent of the Cool Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly early seral over time. Since only a small portion of the Cool Moist PAG is being mechanically treated, the untreated areas would remain predominantly late seral species. The treatments of alternative 4 would change the area that is above the preferred management zone from 99 percent in 2055 under the no action alternative, to only 87 percent above the perfered management zone in 2055 (Figure 27).

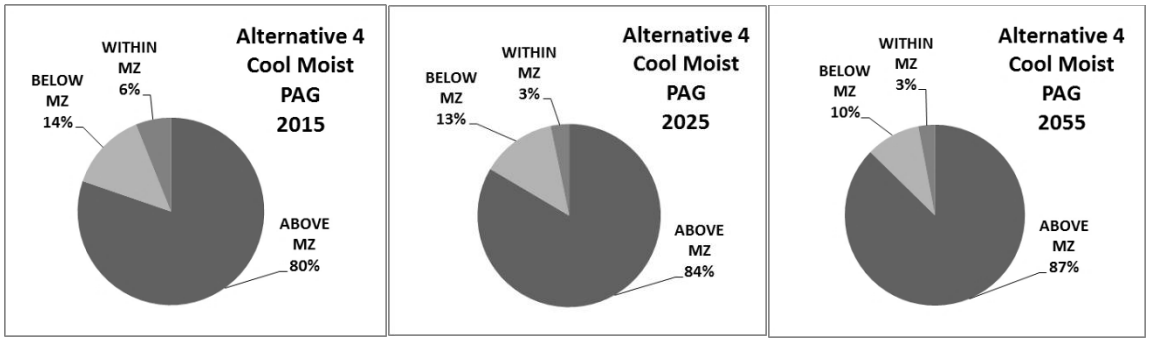


**Figure 27. Cool Moist plant association group (PAG) stand density index under alternative 4 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 41 shows how alternative 4 within the Cool Moist PAG compares to HRV through time. Over time OFMS would continue to be above HRV. OFSS would increase to be well above HRV. There is a trend that after 40 years, the Cool Moist PAG would be deficient in YFMS and UR. SI would be within HRV, but stay on the lower side of the range.

**Table 41. Cool Moist plant association group historical range of variability analysis for alternative 4**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 10% | 6% | 15% |
| Old forest multi strata (OFMS) | 10-30% | 48% | 56% | 75% |
| Young forest multi strata (YFMS) | 40-60% | 3% | 14% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 13% | 10% | 4% |
| Stem exclusion closed canopy (SECC) | 5-25% | 24% | 11% | 4% |
| Understory reinitiation (UR) | 5-25% | <1% | 1% | 0% |
| Stand initiation (SI) | 1-10% | 1% | 2% | 2% |

## Cold Dry Plant Association Group

**Management Zone** – Alternative 4 proposes to mechanically treat 41 percent of the Cold Dry PAG in the Magone project planning area. The Cold Dry PAG makes up only about 1,000 acres of the total Magone project planning area, so only about 1 percent of the Magone project planning area is included in the Cold Dry PAG. Currently, the Cold Dry PAG has over 66 percent in a stocking level above the preferred management zone. Given these actions, the species composition in these stands would continue to be predominantly lodgepole pine due to the prolific nature of the species. Other species that exist in these stands, including western larch and ponderosa pine, would be left to grow and provide for natural regeneration. In the mixed conifer stands, late seral species would predominantly be removed during mechanical treatments and some natural regeneration would be killed with prescribed burning. The activities proposed would decrease the proportion of the Cold Dry PAG that is above the management zone to approximately 68 percent in 2025 (Figure 29). This compares to over 95 percent above the management zone in 2025 under the no action alternative. The area within the management zone would increase from 7 to 12 percent in 2025; however, with no additional activities, the area begins to revert and by 2055 the portion that is above preferred management zone increases to 74 percent and the portion within the management zone is at 8 percent (Figure 28).

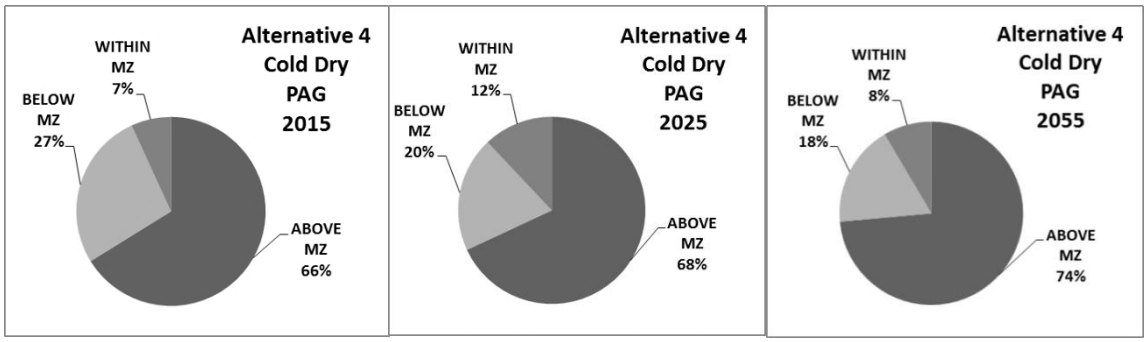


**Figure 28. Cold Dry plant association group (PAG) stand density index under alternative 4 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 42 shows how alternative 4 within the Cold Dry PAG compares to HRV through time. Over time OFMS would continue to be within HRV, increasing in abundance, and OFSS would increase to be well above HRV. There is a tendency that after 40 years, the Cold Dry PAG would be deficient in YFMS. SI would increase slightly over time, staying within HRV. Alternative 4 increases the proportion of old forest over time.

**Table 42. Cold Dry plant association group historical range of variability analysis for alternative 4**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 10-40% | 13% | 2% | 62% |
| Old forest multi strata (OFMS) | 0-5% | 1% | 1% | 5% |
| Young forest multi strata (YFMS) | 10-40% | 3% | 5% | 4% |
| Stem exclusion open canopy (SEOC) | 0-5% | 33% | 41% | 14% |
| Stem exclusion closed canopy (SECC) | 5-20% | 36% | 12% | 3% |
| Understory reinitiation (UR) | 5-25% | 13% | 12% | 5% |
| Stand initiation (SI) | 1-20% | <1% | 7% | 7% |

### Warm Moist Plant Association Group

**Management Zone** – Alternative 4 proposes to mechanically treat 21 percent of the Warm Moist PAG in the Magone project planning area, and prescribe burn approximately 85 percent of the Warm Moist PAG. Given these actions, the species composition in all stands treated would continue to be predominantly ponderosa pine over time. Prescribed burning would likely stimulate shrub recruitment in these PAGs as well. Under the no action alternative, over 90 percent of the stands would be above the management zone in 2025; alternative 4 lowers that to about 80 percent above the management zone in 2025, and increases the area within the management zone from 3 percent in 2055 under the no action alternative, to 7 percent in 2055 (Figure 29).

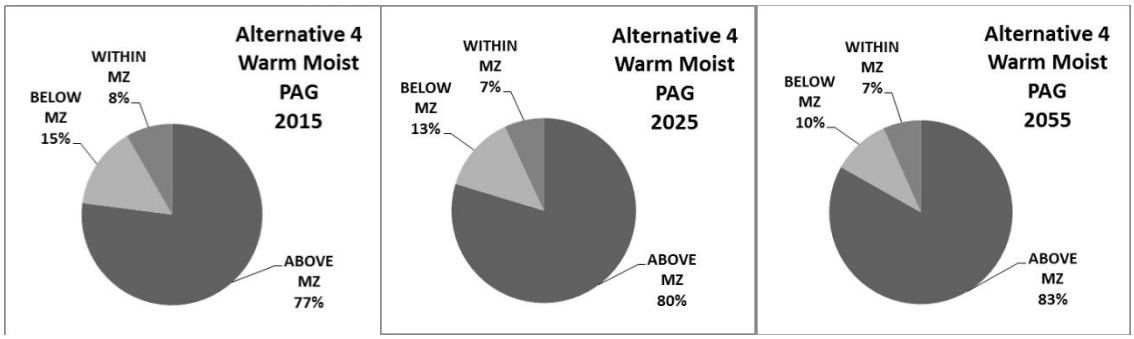


**Figure 29. Warm Moist plant association group (PAG) stand density index under alternative 4 in 2015, 2025, and 2055. MZ = management zone.**

**Plant Association Group Structure and Historical Range of Variability** – Table 43 shows how alternative 4 within the Warm Moist PAG compares to HRV through time. Over time OFMS would rise to be above HRV, increasing in abundance to a little over half of the area, and OFSS would increase above HRV to around 25 percent. There is a tendency that after 40 years, the Warm Moist PAG would be deficient in YFMS and SI. However, alternative 4 increases the proportion of old forest structure over time.

**Table 43. Warm Moist plant association group historical range of variability analysis for alternative 4**

| Structure | Historical range of variability | Existing condition | 2025 | 2055 |
|---|---|---|---|---|
| Old forest single stratum (OFSS) | 0-5% | 2% | 9% | 25% |
| Old forest multi strata (OFMS) | 10-30% | 25% | 38% | 52% |
| Young forest multi strata (YFMS) | 20-50% | 3.5% | 6% | 0% |
| Stem exclusion open canopy (SEOC) | 0-5% | 36% | 23% | 12% |
| Stem exclusion closed canopy (SECC) | 5-20% | 31% | 22% | 11% |
| Understory reinitiation (UR) | 5-20% | 2% | 0% | 0% |
| Stand initiation (SI) | 1-15% | 0.5% | 2% | 0% |

### Effects within the Nipple Butte Inventoried Roadless Area

As described above, the majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055, similar to what would be seen under alternative 2; young forest structure in the Hot Dry PAG would also be below or on the lower end of HRV in 2055, in contrast to the increase in SI to well above HRV that would be seen under alternative 2.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV, with significantly less OFSS and OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2.

**Summary of Effects**

The activities planned under alternative 4 would bring a portion of the project planning area to within or below the management zone. When compared to the no action alternative of 86 percent being above the management zone in 2015, alternative 4 would bring more of the acreage within or below the management zone (with only 69 percent above the management zone). In 2055, alternative 4 would be about 78 percent, while the no action alternative would increase the acreage that is over the management zone to 90 percent. While alternative 4 does bring more of the forested lands to within the management zone, it still leaves over two thirds of the forest in an overstocked condition, and greater than three quarters of the forested land would be overstocked in 2055. With predicted climate changes, this may lead to uncharacteristic forest conditions.

Alternative 4 brings the structure in 2055 somewhat closer to the historical range of variability (HRV). Stand initiation and understory reinitiation remain below HRV. SEOC is 1 percent closer to HRV than the no action alternative. YFMS remains well under HRV, while OFMS is closer to HRV (54 percent in alternative 4 when compared to 64 percent in the no action alternative) at the end of 40 years. HRV for OFMS over the entire project planning area is between 10 to 30 percent. Old forest single stratum diverges further from HRV at 23 percent than does the no action alternative at 15 percent (HRV for OFSS is zero to 5 percent)

Alternative 4 would begin restoration of historical early seral species composition in the areas that are treated. Conifer removal in aspen stands would decrease competition and increase vigor within those areas. Thinning of conifer s, including juniper where it has encroached, would restore those areas to a more historical composition of vegetation.

Alternative 4 would provide 9 MMBF to the local community in forest products and provide jobs associated with harvest and manufacture of those forest products, as well as jobs in the restoration activities planned.

### *Cumulative Effects*

The effects from past practices, which include timber harvesting, fire suppression, grazing, wildfire, and tree planting have created predominantly young, overstocked stands of late seral species that currently persist across the project planning area. Implementing the mechanical methods and prescribed burning of alternative 4 would reduce density and shift species composition of the treated stands in predominantly the mid and old forest stands in all of the PAGs. Stands that are not treated would continue on the current trajectory as defined under the no action alternative.

The Plantation Maintenance and County Road 18 projects are current actions that would reduce stand density and shift species composition of the young, stand initiation stands on approximately 100 acres within the Magone project planning area. Aquatic Restoration Decision activities would shift species composition in some areas, and provide material for streambed improvements in other areas. Cumulatively, alternative 4 activities, plantation maintenance, Aquatic Restoration Decision activities, and the County Road 18 Project would be widespread enough to reduce the risk of large-scale, stand replacement fire and epidemic insect outbreak in all forest structural stages in all PAGs across the project planning area, but would need further treatments in the future to keep progressing toward HRV.

The actions within the Magone project planning area, recent County Road 18 project activities that are in various stages of completion and within directly adjacent subwatersheds, and the potential actions in the Camp Lick Project would cumulatively have an effect on portions of the Grub Creek and East Fork Beech Creek subwatersheds. These actions combined would decrease stand density, shift species composition to a larger proportion of early seral species, and move stand structure towards HRV to decrease the risk of large-scale, stand replacement fire and epidemic insect outbreaks in the Grub Creek and East Fork Beech Creek. Alternative 4 for the Magone Project includes mechanically treating approximately 5,505 acres. The Camp Lick project planning area is approximately 40,000 acres. Recent projects on the Blue Mountain Ranger District have mechanically thinned approximately 25 percent of the project planning area, which would be approximately 10,000 acres for Camp Lick. Some riparian improvement activities will be completed under the Aquatics Restoration Decision. Together, these projects will mechanically thin approximately 12 percent of the cumulative effects analysis area over an approximate 15-year time period.

### 3.2.1.9 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

#### *Malheur Forest Plan*

Alternative 1 does not propose any management actions, but allows the project planning area to continue growing at its current trajectory. This alternative does not meet Forest Goals 24-26 to provide a sustained flow of timber, provide and utilize wood fiber in a cost-effective manner, and provide an economic return to the public. Malheur Forest Plan standards for timber harvest, reforestation, and stand improvement (89-115) and the Regional Forester's Eastside Forest Plan Amendment 2 do not apply to this alternative because no management actions would be proposed.

Alternatives 2, 3, and 4 propose commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal. These alternatives meet Forest Goals 24-26 within current management direction. These alternatives also meet Forest Plan standards 89, 94, 96, 98, and 101-115. Forest Plan standards 90-93 do not apply because they are for even-aged harvest cutting and standards 95 and 99-100 do not apply because they are for traditional uneven-aged harvest cutting. Traditional even-aged and uneven-aged harvesting is not proposed in alternatives 2, 3, or 4. Forest Plan standard 97, which establishes the utilization standards for all species at 7.0 inches DBH, would not be met because utilization standards for ponderosa pine has been increased to 8.0 inches DBH to better reflect market conditions.

Alternatives 2, 3, and 4 also meet Regional Forester's Eastside Forest Plan Amendment 2 (Eastside Screens). Old forest structural stages would not be decreased, since no live trees that exhibit old tree characteristics would be harvested (except for incidental trees cut for road and landing construction and for safety). There would be no net loss of late and old structure (LOS) with the action alternatives. Alternatives 2, 3, and 4 meet the objective to protect existing old forest structure and to shorten the time to grow additional old forest structural stages, since thinning overstocked stands would increase growth rates and sustainability against loss to insects, disease, and fire.

#### *National Forest Management Act*

No harvest is proposed in Malheur Forest Plan management areas that are classified as "unsuitable".

*Other Relevant Mandatory Disclosures*

There are no anticipated long-term significance factors from alternatives 2, 3, or 4 since forest vegetation is renewable as long as the soil productivity is maintained. There may be short-term losses of growth related to soil compaction from new landings, temporary roads, and skid trails. Compaction is to be kept below 20 percent of the forested area and growth reduction on compacted ground is about 15 percent. This would result in a total maximum growth loss of approximately 3 percent per year of the growth potential until the compaction gradually diminished (in about 50 years). These areas are to be rehabilitated after use, but there would be a lag in reforestation and growth since the sites are impacted more heavily than the surrounding forestland.

## 3.2.2 Economics

Although individuals and communities over a wide geographic area use national forest resources, the residents and businesses of counties near the forest depend most heavily on the availability of the resources. Consequently, the effects of forest management on social and economic factors are strongest within these areas. For this reason, the Malheur National Forest primary zone of influence for economic impact is defined as Grant and Harney counties in Oregon.

The Malheur Forest Plan includes forest-wide management goals to:

- Provide a sustained flow of timber for lumber, fiber, and/or associated wood products at a level that will contribute to economic stability, while providing for regional and national forest management.
- Contribute to the social/economic health of communities, which are significantly affected by national forest management.
- Provide an economic return to the public.
- Provide and utilize wood fiber in the form of sawtimber, fiber, and/or associated wood products, while minimizing losses and maximizing outputs in a cost-effective manner, consistent with the various resource objectives and environmental standards.

The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. Minimum specific management requirements to accomplish goals and objectives for the National Forest System are identified in 36 CFR 219.27.

- Section B Vegetative Manipulation: (1) Multiple-use; (3) Not chosen for greatest dollar return; (7) Practical transportation, harvest requirements, and preparation and administration.
- Forest Service policy sets a minimum level of financial analysis for project planning (FSH 1909.17).
- The National Environmental Policy Act (NEPA) requires integrated use of the natural and social sciences in all planning and decision-making that affects the human environment. The human environment includes the natural and physical environment, and the relationship of people to the environment (40 CFR 1508.14).
- Title 40, Code of Federal Regulations for NEPA (40 CFR 1502.23) addresses non-commodity values, stating “For the purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis, and should not be, when there are qualitative considerations.”
- 36 CFR 219.3 – National Forest System Land and Management Planning.

- Executive Order 12898 (February 11, 1994) on Environmental Justice directs federal agencies to identify and address agency programs that may have a disproportionately high and adverse environmental effect on minority populations, low-income populations, or Indian tribes. The order directs federal agencies to focus attention on the human health and environment effects to ethnic minorities (American Indians, Hispanics, African Americans, and Asian and Pacific-Islander Americans), disabled people, and low-income groups.

#### 3.2.2.1 Existing Condition

*Viability of Harvest*

The viability of harvest is dependent upon market prices for raw wood fiber and the costs of harvest that are identified in the methodology section below. Market prices are determined by the supply and demand relationships that exist for wood fiber on a global scale. The local sawmill that could bid on sawtimber from this project is located in John Day. In addition to the local sawmill, three to four large logging contractors usually bid on local timber sales, and if successful, could sell the sawtimber to the local sawmill.Mills outside Grant and Harney counties that may benefit from the timber on this project include La Grande and Pilot Rock. This could have an impact on the economies of these communities as well.

Currently the Malheur National Forest is in the third year of the 10-year stewardship contract. The stewardship contract was designed to help keep jobs and forest products in our local economy. Approximately 80 percent of the Malheur National Forest's fiscal year harvest volume target is to be included in the stewardship contract and the remaining 20 percent is to be included in regular timber sale contracts. This ensures that forest products and the associated jobs will not only be available to local economy, but will also be available to potential outside bidders or mills that may be interested. The Magone Project could be included in a stewardship contract or regular timber sale contract.

*Employment and Income*

Job estimates are based on the assumption of a direct relationship between changes in harvest volumes and manufactured output. In other words, a percentage change in harvest volume would result in a corresponding change in manufactured output and employment. Job estimates included temporary, permanent full time, and part-time employment. Employment effects from recreation and domestic-livestock grazing activities were not analyzed because only minor or no changes were expected in the level of use for these activities. The estimates provided by this analysis also did not include unpaid family workers or sole proprietors. Estimates apply to communities and counties in the regional economic impact zone and not necessarily to any one county.

Levels of harvest volume by alternative would affect employment and income in several ways:

- Directly – employment associated with harvesting, logging, mills, and processing plants for sawtimber, pulp, chips, veneer and plywood
- Indirectly – industries that supply materials, equipment, and services to these businesses
- Induced – personal spending by the business owners, employees, and related industries

Several factors would influence the ability of any one county or community to experience the largest extent of the harvest-related employment and income effects. The financial viability of the timber sale proposals would influence whether potential purchasers closest to the project planning area could compete with other purchasers to acquire the majority of the supply. Changes to bid rates would likely occur during appraisal, depending on actual market conditions at that time. Employment projections would depend on other factors such as market conditions, quality and quantity of the volume offered for sale, timing of the offerings, and financial conditions of local firms.

Agriculture, manufacturing (particularly wood products), and food processing are important sources of employment and income in this region. Reliance on timber and forage from federal lands is moderate to high in several counties in the zone of influence (Haynes and Horne 1997). Many communities in the economic impact zone are closely tied to the forest in both work activities and recreation. Cattle production and forest products provide the core employment for Grant and Harney counties. The forest products industry includes 2 major lumber mills and several logging companies. Forest products employment totaled approximately 347 direct jobs (i.e., mill workers and loggers) and 62 indirect jobs, approximately 8 percent of the total non-farm employment in Grant and Harney counties (average annual in 2013). Local government, retail trade, and services employ the most people in Grant and Harney counties (Oregon Employment Department 2015).

The area surrounding the project planning area is rural and has a disproportionately high unemployment rate compared with the Oregon state average and the National average. Currently (as of January 2015), Grant County is at 10.4 percent unemployment compared to the Oregon state average of 6.3 percent and the National average of 5.7 percent (Oregon Employment Department 2015).

### *Environmental Justice*

The population of the area is predominately white, followed by American Indian. The region is sparsely populated and contains low populations of other minority groups (3.1 percent of Grant County, 4.2 percent of Baker County, and 5.7 percent of Harney County) (United States Census Bureau 2014). The primary American Indian tribes represented are the Burns Paiute Tribe, Confederated Tribes of the Umatilla Reservation, and Confederated Tribes of the Warm Springs. With the exception of the Burns Paiute Tribe, other minority groups are scattered throughout the three counties.

Data regarding minorities or people with disabilities employed in the region’s timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable. Some federal contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration.

### *Economic Efficiency*

Economic efficiency is a term used to describe how inputs are used to achieve outputs when all inputs (activities) and all outputs (including market and non-market) are identified and valued. All costs and all benefits to society are included; amounts of each output are not pre-established but are produced in amounts that maximize net public benefits (FSH 1909.17, §11.1).

Due to unavailable information, the non-wood outputs from this project could not be valued. Therefore, the economic efficiency of this project was measured by cost effectiveness, as recommended by FSH 1909.17.

Cost effectiveness analyses attempt to determine the least costly alternative to produce the desired result. The objective of the cost effectiveness analysis was to show a relative measure of difference between alternatives. Where harvest viability was analyzed for only the commercial units, cost effectiveness was analyzed for all units together. The analysis focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value to assess which alternative came nearest to achieving the purpose and need over the largest land area at the least cost. All dollar values were discounted in terms of the present net value (2015 dollars). The real (exclusive of inflation) discount rate used was 4 percent.

The measurement of economic efficiency differs from the measurement of harvest viability in that economic efficiency attempts to put values on the full range of inputs and outputs (both market and non-market) associated with the project, while harvest viability is more like an accounting procedure that only considers the costs and revenues of the project as expressed in timber markets.

Volumes, costs, and revenues from the commercial units were analyzed for cost effectiveness. The derivation of the commercial unit data is described in the harvest viability section.

### 3.2.2.2 Environmental Consequences

#### *Indicators for Assessing Effects*

The measurement indicators detailed in Table 44, and described above, are used for assessing the economic effects of the Magone Project.

**Table 44. Economics resource indicators and measures for assessing effects**

| Indicator | Measure |
|---|---|
| Viability of harvest | Commercial harvest acreage and volume estimates; and assumed costs of commercial sale |
| Employment and income | Direct and indirect employment; and direct, indirect, and induced income |
| Economic efficiency | Present net value |

#### *Methodology*

The social and economic effects of the proposed management alternative were assessed in terms of viability of harvestable timber, employment supported, and income provided. The following sections describe each of these criteria in detail.

Although the Magone Project has both a commercial and non-commercial component, harvest viability is only relevant to the commercial component. Therefore, viability of harvest was only analyzed for those units that have a commercial component.

The computer program, TEA_ECON, was used to estimate the sale revenues based upon the estimated tentative advertised bid rates per hundred cubic feet ($/ccf) for the commercial acres of the action alternatives (alternatives 2, 3, and 4). These bid rates indicated the economic viability of harvesting timber. The estimates of these bid rates were based on the most current estimates of the following:

- Estimated volume per acre — estimated from local knowledge of stands. All volume is in hundreds of cubic feet (ccf). An average commercial unit volume was estimated at 6.0 ccf per acre.

- Species Composition — 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 45.

TEA_ECON is an economic analysis tool that allows the user to perform timber sale accounting at the planning or sale layout level. The program uses price and cost data and the quarterly updated regional record of timber sale transactions to generate gross timber values, estimated advertised rates, and cash flow estimates.

In this project, cost effectiveness was measured in terms of present net value (PNV) per acre or: PNV/acre = present net costs/acre – present net revenues/acre.

Measurable costs and benefits on commercial units were based on costs and revenue from timber volume proposed for harvest and described under the assumptions for harvest viability.

**Preliminary Value of Timber Removed**: Based on a weighted average for all sales actually sold within Appraisal Zone 3 (primarily Blue Mountain forests) within the last 12 months.

**Costs**: Logging systems, log haul, road maintenance, contractual, brush disposal, erosion control, and other development. These costs are shown in Table 45 and are discounted to present net values at a rate of 4 percent.

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

The 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 the future (e.g., when the 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**: The volume-weighted average bid price of competitively sold timber sales in the previous 4 quarters. This value is updated quarterly.

### *Alternative 1 – No Action*

#### 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 the local mills to purchase would adversely affect employment in local communities in Grant and Harney counties (e.g., Burns, Long Creek, Canyon City, John Day, Mt Vernon, and Prairie City). Lack of timber supply available for purchase by regional mills from outside the economic impact area would potentially affect employment in surrounding counties (e.g., Baker, Ochoco, Union, and Umatilla).

Recent trends of increasing timber harvest from National Forest lands in the area would likely continue in the future and contribute to increases in wood products industry employment. Changes in the economic base and wood 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** – With the no action alternative, the public would incur no costs, nor realize any benefits of timber harvest in this area. No action would yield a present net value of zero due to the data limitations (described in the Methodology section) for quantifying economic benefits and costs beyond those identified at the project level. This value ignores the increased risks to forest health, vigor, and fire resistance that would result without implementation of this project, and the resulting losses in timber values and non-market benefits. Data limitations do not allow for the quantification of this risk, however, this risk would negatively affect present net value. Ongoing costs associated with management of the area, including the continuation of economic losses in forest stand values from recurring forest health problems, would continue.

**Cumulative Effects**

Because of the competitiveness of the market, and its global nature, the no action alternative would not cumulatively affect prices, costs, or harvest viability of other present or future timber sales in the economic impact zone, unless there was no other timber offered on the Malheur National Forest

The selection of the no action alternative would not contribute to the recent increase in timber-related employment in the rural communities of Grant and Harney counties, but may reduce employment in the short-term.

### *Alternatives 2, 3, and 4*

**Direct and Indirect Effects**

Viability of Harvest – The TEA_ECON program was run for harvest viability. The results of each program run, and the effects of all action alternatives on harvest viability, are shown in Table 45.

As shown in Table 45, alternative 2 would produce revenue, estimated at $473,188, alternative 3 would produce revenue, estimated at $984,057, and alternative 4 would produce revenue, estimated at $429,601. The costs would be $765,188 for alternative 2, $1,173,092for alternative 3 and $582,954 for alternative 4. This would produce an estimated present net value of $-292,092 for alternative 2, $-189,035for alternative 3, and $-153,352for alternative 4 for the commercial component. This indicates that alternative 2, 3, and 4 would produce a viable harvest with alternative 3 producing the most viable harvest and alternative 4 the least. Alternative 3 would be most viable because it would treat the most acres and alternative 4 would be the least viable because it would treat the fewest acres.

**Employment and Income** – In general, the primary effect on timber harvest-related employment would occur from commercial harvesting associated with the action alternatives over the next two years. Financially viable sales would be necessary to provide opportunities for timber harvest-related employment.

Non-commercial activities would also provide jobs through contracting; this is not estimated in the employment estimates in Table 45.

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

As Table 45 shows, alternative 2 would generate $2,987,505, alternative 3 would generate $4,580,008, and alternative 4 would generate $2,275,992 in direct, indirect, and induced local income.

Based upon the commercial volume harvested, alternative 2 would support approximately 107 jobs, alternative 3 would support approximately 164 jobs, and alternative 4 would support approximately 82 jobs (both direct and indirect) over the 2-year period and contribute approximately 26 percent for alternative 2, approximately 40 percent for alternative 3, and approximately 20 percent for alternative 4 toward the 2014 annual average of 410 jobs of timber-related employment. Alternative 3 would contribute the most jobs and alternative 4 would contribute the least jobs. Alternative 3 would contribute the most jobs because more acres would be treated and Alternative 4 would contribute the least amount of jobs because fewer acres would be treated.

**Economic Efficiency** – Market benefits that could occur as a result of the proposed activities include increases in forest productivity and value for the remaining trees by eliminating competitive stress and reducing the 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. Refer to discussion of environmental consequences in this environmental impact statement (EIS) for more detailed analysis of whether these external effects would occur. Other sections of this EIS also discuss the non-economic benefits to human and environmental resources for a relative comparison between alternatives.

Table 45 shows action alternative 2 would have a present net value of $-292,092, alternative 3 would have a net value $-189,035, and alternative 4 would have a net value of $-153,352. Alternative 2 would have a net value per acre $-62, alternative 3 would have a net value per acre $-26, and alternative 4 would have a net value per acre $-43. Alternative 4 would have the most economic efficiency because we would be losing less money and alternative 3 would have the least economic efficiency because we would be losing more money.

This economic analysis assessed the action alternatives in terms of harvest viability, local employment and income, and economic efficiency as measured by cost effectiveness. Table 45 summarizes the results of the analysis.

**Table 45. Comparison of economic effects between action alternatives**

| Measure | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Timber volume (ccf) | 28,116 | 43,104 | 21,420 |
| **Acres by harvest method** | | | |
| Ground based | 4083 | 6387 | 3178 |
| Skyline | 603 | 797 | 392 |
| Total acres | 4686 | 7184 | 3570 |
| **Total present value benefits** | | | |

| Measure | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Average bid price ($/ccf) | 18.20 | 24.69 | 21.69 |
| Discounted revenues ($) | 473,188 | 984,057 | 429,601 |
| Discounted cost ($) | 765,188 | 1,173,092 | 582,954 |
| Present net value ($) | -292,092 | -189,035 | -153,352 |
| Present net value/acre ($) | -62 | -26 | -43 |
| **Total present value costs** | | | |
| FS prep and administration ($/ccf) | 281,160 | 431,040 | 214,200 |
| Stump to truck ($) | 94.78 | 89.52 | 91.29 |
| Log haul ($) | 26.87 | 26.87 | 26.87 |
| Brush disposal ($3/ccf) | 84,348 | 129,312 | 64260 |
| Road maintenance/Erosion control ($1/ccf) | 28,116 | 43,104 | 21,420 |
| Temporary roads (miles) | 9.3 | 13.3 | 8.9 |
| **Employment** | | | |
| Direct jobs | 67 | 103 | 51 |
| Indirect jobs | 40 | 62 | 31 |
| Total jobs | 107 | 164 | 82 |
| **Income** | | | |
| Direct ($) | $1,866,746 | $2,861,823 | $1,422,156 |
| Indirect and induced ($) | $1,120,759 | $,1,718,185 | $853,836 |
| Total ($) | $2,987,505 | $4,580,008 | $2,275,992 |

*It is estimated that approximately 20 percent of the total volume is green convertible biomass (ponderosa pine 7 to 10.9 inches diameter at breast height).

### Cumulative Effects

**Viability of Harvest** – Estimates for tentative advertised sawtimber bid rates for the action alternatives (alternatives 2, 3, and 4) are within the range of rates experienced by the three Blue Mountain forests (Malheur, Umatilla, and Wallowa-Whitman) within the last two years. There are also residual effects from past timber sales within the subwatershed which would not have a detrimental effect on the viability of harvest of the action alternatives. These past actions are described in detail in Chapter 3 of this DEIS.

**Employment and Income** – The action alternatives would provide some potential short-term economic relief by utilizing commercially thinned sawlogs. This material would potentially be used to support the sawmill operating in John Day. 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 the 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 the two counties in various stages of planning that potentially may add to the Forest's annual timber offerings for 2015 and beyond. For example, the Big Mosquito and Camp Lick projects on the Blue Mountain Ranger District, the Elk 16 and Summit projects on the Prairie City Ranger District, and the Wolf and Dove projects on the Emigrant Creek Ranger District. These ongoing and foreseeable projects are expected to add cumulatively to the employment and income of Grant and Harney counties during the life of the Magone Project.

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

*Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans*

The action alternatives are consistent with the following Malheur Forest Plan objectives and standards:

- Provide a sustained flow of timber for lumber, fiber, and/or associated wood products at a level that will contribute to economic stability, while providing for regional and national needs (USDA Forest Service 1990a, Forest Goal 24, page IV-2).
- Provide and utilize wood fiber in the form of sawtimber, fiber, and/or associated wood products in a manner that will minimize losses and maximize outputs in a cost-effective manner, consistent with the various resource objectives and environmental standards (USDA Forest Service 1990a, Forest Goal 25, page IV-2).
- Provide an economic return to the public (USDA Forest Service 1990a, Forest Goal 26, page IV-2).
- Forest-wide Standard 103 (USDA Forest Service 1990a, page IV-38): Timber harvest is prohibited on lands classified as unsuitable for timber management except when necessary to accomplish multiple-use objectives other than timber production. All lands proposed for commercial timber harvest in the action alternatives are suitable for timber management.

The no action alternative would not meet the Malheur Forest Plan goals and standards described above because this alternative would not produce any timber or associated wood products or provide an economic return to the public.

# 3.3 Key Issue – Recreation Developments

## 3.3.1 Existing Condition

### 3.3.1.1 Recreational Opportunity Spectrum

The recreation opportunity spectrum (ROS) is a description of various attributes that contribute to a particular recreational setting. The ROS describes recreational settings in terms of the "combination of physical, biological, social, and managerial conditions that give value to a place" (Clark and Stankey 1979). ROS categories are used as guidance for the management and future development of recreational facilities. Map 16 Recreation Opportunity Spectrum in Appendix B – Maps shows the ROS settings that apply to the Magone project planning area. They are described as:

- **Roaded Natural**: This is the setting for approximately 33 percent of the project planning area (8,956 acres). The "area is characterized by predominately natural-appearing environment with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities" (USDA Forest Service 1990a, page VI-28).

- **Roaded Modified**: This is the setting for approximately 25 percent of the project planning area (6,873 acres). This "area is characterized by a natural environment that has been substantially modified by development of structures and vegetative manipulation. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available" (USDA Forest Service 1990a, page VI-28).
- **Semi-Primitive Motorized**: This is the largest ROS setting, making up approximately 42 percent of the project planning area (11,187 acres). This "area is characterized by a predominately natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted" (USDA Forest Service 1990a, page VI-28).

#### 3.3.1.2 Special Features

The 11,354-acre Nipple Butte Inventoried Roadless Area (IRA) dominates the western half of the Magone project planning area; 10,017 acres (88 percent) of the IRA lies within the boundary of the project planning area. This IRA is a popular hunting destination. The southern portion of the IRA is a designated wildlife emphasis area (WEA) that comprises nearly half of the IRA that lies within the project planning area.

The Magone project planning area also includes the 328-acre Magone Lake recreation area, of which Magone Lake is the centerpiece. The Magone Lake recreation area is the most significant recreation resource within the project planning area and the most popular developed recreation resource on the Blue Mountain Ranger District.

Magone Lake, which lies near the center of the project planning area at 5,000 feet elevation, was formed by a landslide in about 1840. Nestled at the base of the landslide, the lake has important historical and geological significance. The lake is named after Major Magone, who first stocked the lake with fish carried up in buckets. Magone Lake is now stocked with fish annually by the Oregon Department of Fish and Wildlife.

The 185-acre Magone Geological Area lays at the southwest end of Magone Lake. The center point of this special interest area is the landslide that formed Magone Lake. This is an important recreational resource, as there is a trail that leads to a viewpoint of the slide.

For hunting, the Magone Project area lies within Oregon Department of Fish and Wildlife's Northside Wildlife Management Unit.

#### 3.3.1.3 Recreational Seasons of Use

Peak use periods are late May to early September and for hunting from August through November. Camping, fishing, driving for pleasure, and other dispersed activities such as woodcutting, will often continue beyond the typical seasons unless snow makes motorized access to the area impractical. During deer and elk hunting seasons, hunting and related camping becomes the dominant recreational activity in the project planning area. During the winter, ice fishing occurs on Magone Lake.

The Magone Lake recreation area is staffed by campground hosts from Memorial Day to Labor Day and most of the recreation area use occurs during this time period. Magone Lake Campground fees are collected throughout this same period, and are the largest source of recreation revenue to the Forest Service from recreation within the Magone project planning area. Fees are also collected for use of the group camping area and picnic shelter during peak periods.

#### 3.3.1.4 Recreation Facilities and Activities

Recreation on the Malheur National Forest is focused where there is water or access to trails or dispersed recreation. The most popular recreation activities on the Forest are driving for pleasure, hunting, hiking and walking, viewing wildlife, relaxing, primitive camping, and viewing natural features (USDA Forest Service 2010b). Although these recreation activities occur throughout the Forest, the Magone Lake recreation area provides some of the premier summer recreation opportunities, including camping, hiking and walking, viewing wildlife and natural features, picnicking, relaxing, swimming, and fishing for rainbow and brook trout. The Magone Lake recreation area and surrounding land is classified as "Roaded Natural" on the recreation opportunity spectrum (see descriptions above). The Magone Lake recreation area consists of:

- Magone Lake Campground, a developed fee campground with 29 campsites, including one host site and a group camping area.
- One sheltered picnic area with picnic tables, barbecues and one oversized fire ring.
- A developed day-use beach area with picnic tables, barbecue grills, fire rings and changing rooms.
- A boat launch area with a large interpretation sign, large parking area, boat launching dock, and picnic tables. The boat launching dock angle is a problem for many boaters, as it rests at an angle from the concrete boat launching pad.
- One accessible fishing dock.
- One small boat mooring dock on the north end of the lake, across from the campground host site. This dock is in poor condition. Its location is inadequate, as users must paddle boats through thick lake vegetation before arriving in deeper waters.
- Seven CXT vault toilet buildings.
- A solar well-water system that provides potable water to the campground, group campground, picnic shelter, and beach.

Magone Lake recreation area capacity is measured in "people at one time" (PAOT). The campground has a capacity of 145 PAOT (average of five people per campsite), while the greater recreation area has a capacity of 346 PAOT (includes the campground plus a designated average of 3.5 people per day-use vehicle space). The Magone Lake recreation area is rarely filled to capacity. The campground occasionally fills up on weekends during July and August. Day use hits its peak on hot summer weekends. Only then, if ever, does total use approach the PAOT capacity of the recreation area.

Magone Lake recreation area receives 11,932 annual site visits (USDA Forest Service 2010b). The agency's National Visitor Use Monitoring (NVUM) information does not include temporal distribution data. However, considering the fact that the bulk of use is between Memorial Day and Labor Day, we used professional judgement to determine that 90 percent of use (10,739 visits) occurs during an annual period of 100 days. That usage level would average to 107 visits per day. PAOTs tend to be lower than daily visits since the daily visitors to an area may not necessarily all be there at the same time.

With average PAOTs currently less than 107, and maximum capacity at 346 PAOTs, we can conclude that Magone Lake recreation area is well under capacity.

Magone Lake Campground receives 3,950 annual site visits (USDA Forest Service 2010b). As with the recreation area, the NVUM information did not include any temporal distribution data on the campground. However, using the same process as we did with the recreation area, we used professional judgement to determine that usage level would average to 36 visits per day. With a maximum capacity of 145 PAOTs, we can also see that Magone Lake Campground is normally well under capacity.

Although the Magone Lake recreation area provides the largest variety of recreation activities within the Magone project planning area, it does not provide the only recreation opportunities. The project planning area includes 61 dispersed recreation campsites, 7 miles of foot/horse/bicycle/off-highway vehicle (OHV) trails and many miles of primitive roads. The portion of the Nipple Butte trail that is not on a road is a general purpose trail that is open to all of the aforementioned modes of travel. It traverses the ridgeline on the north border of the Magone project planning area and lies partially within the project boundary. Dispersed camping occurs throughout the project planning area, but is most heavily concentrated in the eastern half. This is because the western half of the project planning area is dominated by the Nipple Butte inventoried roadless area. Dispersed camping with motor vehicles is most popular along or near Forest Service road (FSR) 18 and 36. One of the largest and most used dispersed camping areas is at “Four Corners,” located at the junction of FSR 18 and 36. Heavy use over the span of many years is evidenced by denuded vegetation and multiple rock fire rings in many dispersed camping areas. Motorized use for both highway legal and non-highway legal vehicles (OHVs) is allowed on all open roads within the project planning area except for the main roads 36, 3618 and 3620. The other main road through the project planning area, road 18, is a county administered road. Those who meet county requirements may legally ride their OHVs on this road.

### *Developed Trails*

There are currently 7 miles of developed trail within the Magone project planning area. The following trails are within the Magone Lake recreation area:

- A class 5 (Fully Developed) Magone Lake barrier-free trail (0.3 miles) that lines the northwest side of the lake.
- A class 4 (Highly Developed) Magone Lake foot trail (1.1 miles) that completes the loop by circling around all but the northwest side of the lake.
- A class 3 (Developed) Magone Slide foot trail (0.5 miles), which leads to a viewpoint of the landslide that formed Magone Lake.

The Magone Lake trail is popular among Magone Lake campers and day users. It affords opportunities for leisurely walking, hiking, fishing, and getting away from the development. The Magone Slide trail offers a short activity for visitors to Magone Lake recreation area, but is not itself a destination hike. In fact, many visitors to Magone Lake are unaware the trail exists. While the Magone Lake trail is easily discovered upon the approach to the lake, the beginning of the Magone Slide trail is less obvious, due to its location.

Existing trails outside of the Magone Lake recreation area include:

- Behind Magone bicycle trail (2.2 miles) on a closed road.
- Lake Butte bicycle trail (3.9 miles total; 1.7 miles within the Magone project planning area) on closed and open roads.
- Nipple Butte general purpose/bicycle trail (11.4 miles total; 1.1 miles within the Magone project planning area) on open roads and general purpose trail.

The Behind Magone and Lake Butte trails are closed roads that were re-classified as trails. A portion of the Lake Butte trail is over open roads, including the arterial Forest Service road (FSR) 18. A large portion of the Nipple Butte trail is on open roads designated as trail as well. The portion of the Nipple Butte trail that is not on a road follows the Lake Butte/Nipple Butte ridge line and was cut straight up the slopes with no regard to contour. It follows a fence line, and in some cases, the trail is so close to the fence it is dangerous for bicycle riders. Most of the Nipple Butte trail within the Magone project planning area (1 mile) is trail not on a road, spread across six trail segments. A small portion of the Nipple Butte trail within the project planning area (0.1 miles) is on a road.

The Magone project planning area trail mileage that resulted from closed roads re-classified as bicycle trails were never designed for, nor improved, for bicycle use. The trails are blocked by gates that are used for closing roads. There is no indication on site that the trails exist, and for those who manage to find them, the trails appear uninviting and uninteresting. Recreating visitors to the Magone project planning area are faced with a lack of interesting bicycle trail options or destinations, inadequate distances, unsafe design, lack of challenge or loop opportunities, poor surface conditions and a complete absence of the obstacles, tight turns and frequent grade reversals that are normally associated with bicycle trails.

#### *Access*

The primary roads through the project planning area for accessing recreation opportunities are Forest Service road (FSR) 18, 36, 3618, and 3620. FSR 18 provides paved passenger car access to the Magone Lake recreation area from the southeast, and is the easiest route to the lake. FSR 18 continues past the junction with FSR 3620 and provides a route to the town of Long Creek. FSR 3620 is paved from its junction with FSR18 until it connects to 3618, which is paved all the way through to the southwest end of the Magone Lake recreation area. FSR 3618 continues south and intersects with FSR 36, which provides east-west access through the southern portion of the Magone project planning area. All of the developed facilities and trailheads within the project planning area are accessed via these four roads.

## 3.3.2 Environmental Consequences

### 3.3.2.1 Indicators for Assessing Effects

The measurement indicators detailed in Table 46, and described above, are used for assessing the recreation effects of the Magone Project.

**Table 46. Recreation resource indicators and measures for assessing effects**

| Indicator | Measure |
|---|---|
| Recreation opportunity spectrum (ROS) | Impacts to ROS classes |
| Recreation opportunities | Changes to recreation opportunities in the Magone project planning area |
| Public access to recreation | Safety along identified escape corridors from Magone Lake<br>Changes in miles of open road |

### 3.3.2.2 Methodology

The Malheur National Forest uses recreation opportunity spectrum (ROS) classes to develop management direction for recreation on the Forest. This analysis would use the ROS classes defined by the Malheur Forest Plan as the basis of this assessment.

Geographic information system (GIS) information was used to query and analyze data and create maps displaying location of dispersed campsites, trails, big game management units, fuelwood gathering, and analysis of Forest Plan ROS mapping and proposed treatments. In addition, field work and observed visitor activities from the recreation specialist are incorporated to confirm GIS analysis, and to provide perspective on local forest activities.

#### *Spatial and Temporal Context for Effects Analysis*

The spatial context for this analysis is the Magone project planning area. The effects to the recreation resources can be short-term and long-term. Short-term is usually less than 5 years, and long-term is 5 years to 50 years.

### 3.3.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

**Direct and Indirect Effects to Recreation Opportunities**

The no action alternative would perpetuate existing conditions in the Magone project planning area. The Magone Lake recreation area would remain the centerpiece for recreation in the project planning area. Seasonal usage patterns and developed recreation would remain the same. Visitor use would be expected to remain fairly level. The Magone Lake campground would remain below “people at one time” (PAOT) capacity during all but the busiest weekends in July and August. The Magone Lake day use areas would only approach PAOT capacity during hot summer weekends. Existing dispersed camping opportunities and hunting experiences would continue as they are today. Vegetation would continue to move away from historical conditions, and increasing understory vegetation and ground fuels would increasingly obstruct cross-country travel for recreationists. Activities related to silvicultural treatments and prescribed burning would not affect recreationists in the Magone project planning area.

Attractive mountain biking opportunities would continue to be nonexistent, as the trails on roads that currently exist were designed for vehicles, not bicycles. Bicyclists using the Nipple Butte or Lake Butte route would continue to encounter vehicle traffic as they follow the section along County Road 18. The Nipple Butte trail, which traverses straight up steep slopes along a fence line is more suitable for off-highway vehicles (OHVs) than bicycles, and would remain the only option for mountain bikers who want to experience more than a short trail ride on a closed road.

OHV users, bicyclists and hikers on the Nipple Butte trail would continue to have their experiences affected by the presence or evidence of other user groups, as the trail would remain as a general purpose trail. The Nipple Butte trail would remain the only trail option for OHV users. Area hiking opportunities would remain limited to the trail around Magone Lake, the Magone Slide trail, the Behind Magone trail, and the Lake Butte trail. Hikers and mountain bikers using the Behind Magone trail would continue to encounter an uninviting start of the trail, with a gate designed for vehicle traffic and a complete absence of informational signage. Impacts such as soil compaction from user-created trails, sanitation issues, and vegetation removal would continue at current rates.

The fishing and boating opportunities at Magone Lake would not be improved. The boat launching dock would remain at an inconvenient angle from the boat launching ramp. The boat mooring dock on the north end of the lake would remain as-is, and boaters would continue to have to paddle through weeds to approach or leave the dock. Fish habitat and fishing opportunities would not be improved.

**Direct and Indirect Effects to Public Access**

The no action alternative would not directly affect the access roads to the Magone Lake recreation area. County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan, would not receive fuel reduction treatments. The continued buildup of fuel loads would have the indirect effect of decreasing safety in the Magone Lake recreation area by increasing the risk of uncharacteristic fire along these routes.

Recreational use of forest roads would not be immediately affected, as there would not be any changes to the existing road system. The area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the recreation opportunity spectrum.

### *Cumulative Effects*

In choosing the no action alternative, the effects of decades of fire suppression would compound with the present day decision to not take restorative action on the landscape. Over the next decade, vegetation would continue to move away from historical conditions. The increasing understory vegetation and ground fuels would diminish the viewshed, obstruct cross-country travel for recreationists, and diminish ecological resilience. Because healthy forests are the backdrop to a multitude of outdoor recreation activities, ecological resilience of the forests is crucial in providing the desired array of recreation opportunities (Krieger 2001). Due to past forest management practices, there is now an urgent need to collaboratively engage in ecologically and environmentally responsible, socially acceptable, and economically feasible and sustainable forest restoration projects. The effects to recreational values of insect infestations are similar to that of fire. Study results indicate that less intense fires may have beneficial economic effects, whereas intense fires may have detrimental effects on recreation values (Vaux et al. 1984). By not taking action, the mistakes of the past would be compounded, and the opportunity to mitigate the effects of severe fire could possibly be missed.

### 3.3.2.4 Alternative 2 – Proposed Action

*Direct and Indirect Effects*

**Direct and Indirect Effects to Recreation Opportunities**

**Silviculture Treatments** – Under alternative 2, 11,872 acres would be treated across 283 units. The direct effects to vegetation from the silvicultural treatments in the Magone project planning area are detailed in the Forest Vegetation section of this DEIS. Each prescription would open up the understory through biomass removal, which would facilitate cross-country hiking through the forest as well as enhance the viewing opportunities during such treks (see Visuals Report). Alterations to the forest structure would also affect the movement of wildlife. Recreationists would find increased opportunities for wildlife viewing due to a more open forest structure. Ground fuel and fuel ladder reductions would improve the safety of recreationists at developed and dispersed recreation sites during the summer season. Alternative 2 would have a direct effect on scenery and noise levels from activities such as cutting, skidding and decking logs, piling and burning non-commercial woody material and logging slash, and operating heavy machinery around and within the vicinity of the Magone Lake recreation area, trails, and dispersed campsites. The silvicultural treatments under alternative 2 would affect users of the existing recreational facilities during and after the time that the activities take place. Visitors to the area, and specifically those hiking the trails, may be inconvenienced by the treatment activities when they occur. The Behind Magone trail, the southern portion of the Lake Butte trail, and the beginning segment of the Magone Slide trail could have a temporary reduction in recreational opportunities due to a significant amount of commercial and non-commercial thinning which could require temporary trail closures. The direct effects of the silvicultural treatment activities and associated noise, recreation area closures due to the activities, and the immediate evidence of ground disturbances could detract from the recreation experience. The silvicultural treatments that would occur adjacent to the lake could detract from the recreation experience of snowmobiling and ice fishing if the activity occurs over snow. However, the long term effects of a cleaner and more open forest floor and enhanced grass growth is expected to benefit the recreation experience. By 2 to 3 years after the primary mechanical activities occur, it is unlikely that the change in vegetation would be noticed by many forest visitors. The ground disturbance from the activities, including skid trails, would be much less evident after 2 to 5 years. Thus, the effects to vegetation and forest structure from the silvicultural treatments would have a minimal impact on the number of visitors to the area.

**Prescribed Burning** – Through fuel reduction treatments, alternative 2 would reduce the fire risk to developed and dispersed recreation and the surrounding recreational setting. Although biomass removal and prescribed burning may have short-term negative impacts on the recreational experience, severe fire could devastate the viewshed and recreational opportunities, which would have a long-term impact on the corresponding recreational experiences. The activities under this alternative would help to restore historical forest structure, composition, and density, and create more resistant and resilient vegetative conditions. Instead of deferring treatments, which would increase the risk of insect and disease infestations and high severity fire, alternative 2 would begin to address the need for restoration and enhance the recreational setting. Under alternative 2, planned ignitions would take place on up to 28,500 acres, which includes all of the burn units in the project planning area. Planned ignitions could occur during any season. The direct effect of these actions would be primarily on visuals (see Visuals Report); however, there would be indirect effects through vegetation enhancement, increased wildlife habitat and safety through fuels reduction.

Prescribed burning may impact recreationists by creating smoke and restricting access to treatment areas. Prescribed burning has the potential to affect hunters who want to access the area where the prescribed burning is taking place. Hunting and camping opportunities and experiences could be negatively impacted by the presence of smoke. The smoke and activity in the area could also have an effect on the presence or absence of big game. The Magone Lake campground and day use areas and the area immediately surrounding them are not included in the ignition units. However, smoke from the burning would have a short-term impact on recreationists in the Magone Lake recreation area when prescribed fire operations take place nearby (units 4 and 5). Recreationists may be impacted by the increased activity in the area, including an increase in traffic associated with the project, corresponding noise, and possible temporary road closures. Outside of the times when silvicultural and burning activities occur, alternative 2 would not directly affect access roads to Magone Lake recreation area. In the Grant County Community Fire Protection Plan, County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620 are designated escape corridors from Magone Lake and would receive fuel reduction treatments and thus remain safer for use as emergency ingress/egress routes.

**Road Activities** – Recreational use of forest roads would be minimally affected by changes in road closure status, as the affected roads are no longer contributing to integrated land management objectives. Approximately 1.1 miles of road would be closed across 4 road segments and 0.3 miles of road would be decommissioned across 1 road segment. About 4 miles of road would be co-designated as trail; co-designating road as trail would not change the existing open road system. Recreational driving would benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest. Road maintenance for hauling would occur on 77.7 miles of road across 78 road segments. Additional road activities for silvicultural and harvest activities would be 9.3 miles of temporary road construction and 28.7 miles of closed road that would be temporarily opened for hauling. Those temporary actions would have minimal impact on recreation.

**Magone Lake Restoration Activities** – Under alternative 2, fish habitat improvements would serve to enhance fishing opportunities. Fish habitat would be improved through the placement of 15–20 fish cribs, as well as the placement of 70–100 “fish sticks” (logs that lay into the lake with one end on land) in singles and clusters of 5–7 trees mostly 8 to12 inches diameter at breast height (DBH) throughout the lake. This could have the effect of distributing recreationists along the lake shore for fishing opportunities either between logs, or “fish sticks” to avoid the potential of snagging their fishing line, or on the logs as they locate their favorite “log dock” to go out on to cast their line. Although these fish habitat developments are intended to enhance fishing opportunities, they could have the effect of slightly increasing fishing pressure. Under alternative 2, visitor use of the Magone Lake recreation area as a whole would be expected to slightly increase due to the new developments described above. The campground and day use areas at Magone Lake would remain below “people at one time” (PAOT) capacity during all but the busiest of summer weekends. During hot summer weekends, the PAOTs for day use at the recreation area may approach capacity, as swimming and other water related activities increase; however, that is driven by high temperatures and would not be an effect of the developments. Seasonal usage patterns might increase due to the improvements in water related recreation developments.

**Recreation Opportunity Improvements** – Trail developments under alternative 2 would increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. New family oriented recreation opportunities would be created that would benefit those camping nearby. Hikers and mountain bikers from both the local communities and from outside of the area would receive new recreation opportunities as well. The opportunities would be created through 48.8 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and a new trailhead at Four Corners. There would be 40.7 miles of new trail construction with all but 1.5 miles of it being hiking/bicycle trail. The remaining 1.5 miles, the North Magone Connector trail (0.1 miles) and the extension of the Magone Slide trail (1.4 miles), would be hiker only trail. A substantial portion, 6.7 miles, of the resulting trail system would be trail co-designated on existing road. The new trail developments are compatible with the rustic character of the Magone Lake recreation area (see consistency with Malheur Forest Plan, below). Of the 40.7 miles of new trail construction proposed under alternative 2, only 0.2 miles would be built within the Magone Lake recreation area. The new trail construction within the recreation area would be located outside of sight and sound distance of the most heavily used areas. It would fall well below the roaded natural characteristics of moderate evidence of the sights and sounds of humans and prevalent evidence of and moderate to high Interaction between users. However, a disturbance to recreation experiences could still occur during the construction period due to activity generated noises. Outside of the Magone Lake recreation area, dispersed recreationists could encounter trail users in areas where under existing conditions, they would not have the encounter. It could potentially detract from the recreationist's experience of seclusion.

The new construction portions of the hiking/bicycle trails would be constructed to meet single-track mountain biking trail standards, as specified by the International Mountain Biking Association (IMBA) and adopted by Central Oregon Trail Alliance (COTA). Trail construction, maintenance, funding and organization of such activities would be done primarily by the local COTA, Grant County Chapter through a formal agreement. The agreement would pertain to existing trails, as well as new ones. All the proposed trails would be designed as bicycle/hiker or hiker only. As such, motorized access would be prohibited. Engineering controls and education would be used foremost to prevent OHVs from accessing the trails. Signage would be placed at trailheads to indicate the allowed modes of travel on the trails. Trail design techniques such as routing trails between large trees, and using bicycle width cattle guards at fence crossings would be used to discourage OHV use of the trails. Motorized access would continue to be allowed on the existing general purpose Nipple Butte trail. The trails would not be designed for equestrian use, but would not disallow it except for on the hiker only trails. Multiple use trail etiquette information would be provided at trailheads.

There would be new trail within the Nipple Butte Inventoried Roadless Area (IRA). Most of the IRA trail mileage would be along the McClellan trail (6.5 miles of new construction in the IRA), which would go from the Nipple Butte trailhead to the southeast portion of the IRA. The McClellan trail would create a loop opportunity for hikers/bikers on the Jugow trail, offering scenic hiking and biking opportunities, and offer a loop opportunity on the Round Top trail by providing southern access to it. 2.0 of the 6.5 miles would be located along the eastern edge of the wildlife emphasis area. The Wade trail, which connects the McClellan trail to itself by cutting off the southern portion of the McClellan trail and creating a smaller loop, is the other trail with substantial IRA mileage (2.5 miles in IRA). Also within the IRA would be 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border). 1.2 miles of the new construction portion of the Lake Butte trail would be in the "thumb" of the IRA.

The Low Slope trail and Behind Magone Loop trails would serve to enhance the recreational opportunities by creating shorter loop options for hikers and bikers. Due to the improvement and re-routes, bicyclists using the Nipple Butte or Lake Butte trails would no longer need to follow along County Road 18. This would eliminate the safety issue involved with bicycles encountering vehicle traffic. Connecting into the northern portion of the Lake Butte trail would be the Camp Lick Connector trail, which is a proposed short segment of trail with the purpose of tying the Magone trail system into the Eagle Rock trail, which is being proposed and would primarily be located in the Camp Lick project planning area. Accessibility to the Behind Magone trail would be enhanced by moving the start of the trail across from the Tinker Creek trailhead. Hikers and mountain bikers using the Behind Magone trail would be able to access it from the south end of the lake (near the outlet bridge) via the newly constructed trail segment, as well as from the Tinker Creek trailhead. The Magone Lake trail would be opened to bicycles (for a small segment of the trail) and hardened from the boat dock parking area to the new junction with the Behind Magone trail to prevent an increase in sedimentation. Access to the Behind Magone trail from the Tinker Creek trailhead would involve only needing to cross FSR 3618, rather than traveling along it. Hikers would also have access to the Behind Magone trail via the small North Magone Connector trail that connects to the Magone Lake trail at the north end of the lake. The Round Top trail (19.7 miles) starts at the southern-most point of the McClellan trail and goes to the southeast across East Fork Beech Creek. It then works its way east along the southern end of the Magone project planning area, crosses the northern flank of Round Top, then goes northeast to Four Corners. From Four Corners, it works its way back to the west, crossing FSR 3620 at Tinker Creek, then following FSR 3620-646 north and FSR 1800-311 west to the Lake Butte trail where it ends. The Round Top trail would provide scenic hiking and biking routes with varied terrain between Four Corners and the Magone Lake recreation area.

The new trail developments under alternative 2 would provide increased recreational opportunities for visitors that would like to leave the campground for a small to moderate hike or bike ride, but could potentially be extensive enough to attract single track mountain bikers from nearby metropolitan areas such as Bend or Boise that would like to experience mountain biking with more solitude (MBOSC 2007). The new construction single track Jugow trail, McClellan trail, Wade trail, Round Top trail, the new connecting portion of the Lake Butte trail and the improvement and expansion of the Behind Magone trail would be the primary attractors of mountain bikers.

Access to trails would be more inviting, safe, and convenient due to new and better access to and improvement of trailheads, including better access roads and informational signing and graveled parking areas. The Nipple Butte and Tinker Creek trailheads would both be improved with graveled parking areas and informational signage. The improvement of the Tinker Creek trailhead would utilize the space of an existing dispersed campsite. The dispersed site, which would cease to exist, is the closest dispersed site to the Magone Lake recreation area. The newly constructed Four Corners trailhead would be constructed at the start of the closed FSR 1800-805. It would include a graveled parking area for four vehicles and informational signage. The Four Corners trailhead would provide access to the Magone trail system via the Round Top trail. It could also potentially be the start of the Four Corners trail, which is being proposed and would be primarily in the Camp Lick project planning area. Trail accessibility would be more convenient due to the relatively short distance to Four Corners from the local towns. This would provide increased opportunities for recreation when time is limited.

Under alternative 2, the Magone Lake recreation area would remain the centerpiece for recreation in the project planning area. The Magone Slide trail would be extended 1.4 miles around and over the top of the landslide creating a very scenic loop hiking opportunity. An interpretive sign on the east side of the lake would be placed where the Magone landslide that formed the lake is in view and would interpret the geology and history of the slide. A sign with the same information about the landslide would be placed at the top of the slide alongside the extended Magone Slide trail.

About 0.2 miles of the existing Magone Lake trail would be fully developed to a class 5 (on the trail development scale) accessible trail from the campground to the north end of the lake. At the end of the trail improvement, a small area would be leveled and a picnic table placed. An interpretive sign describing the nearby beaver activity would also be located there. The trail improvement would not only improve accessibility to the north end of the lake, but would serve to fortify that segment of trail against any increased use that would occur. Since the stretch of Magone Lake trail that runs from the beach area to the campground is already fully developed, this improvement would be an extension of the accessible trail that currently exists. Thus, it would not affect the rustic character of the Magone Lake recreation area.

Recreation developments within the campground itself would remain as they currently exist. The boat launch dock would be modified and the boat mooring dock would be replaced, improving visitor boating opportunities. The boat launching dock would be modified for improved function, eliminating the inconvenient angle of the dock to the boat ramp. The boat mooring dock on the north end of the lake would be replaced and moved south so that boaters would no longer need to paddle through weeds to approach or leave the dock.

The proposed actions are intended to enhance the visitor experience by improving and creating recreation opportunities that are compatible with the recreation opportunity spectrum (ROS) and consistent with the Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan). Under alternative 2, the area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. Roaded Natural is “characterized by predominately natural-appearing environments with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities” (USDA Forest Service 1990a).

### Direct and Indirect Effects to Public Access

Alternative 2 would not directly affect the access roads to the Magone Lake recreation area. County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan, would receive fuel reduction treatments under this alternative. The reduction in fuels along these routes would have the indirect effect of increasing safety in the Magone Lake recreation area by decreasing the risk of uncharacteristic fire along these routes.

As stated above, recreational use of forest roads would be minimally affected with 1.1 miles of road being closed and 0.3 miles of road being decommissioned. Recreational driving would indirectly benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest.

### *Cumulative Effects*

Sights and sounds created by future silviculture, commercial harvest, and prescribed burning activities combined with the sights and sounds created by the Magone Project implementation, would not have a cumulative effect on recreation. However, the resulting open forest structure resulting from those activities would. The resulting open forest structure from similar treatments, harvests and burns in future adjacent projects, combined with the Magone project would provide increased opportunities for viewing wildlife and other natural features, and create safer recreation opportunities by creating larger swaths of open forest. Creating larger swaths of open forest in the same area could enhance hiking, driving for pleasure and other recreation opportunities. The road maintenance that would occur under alternative 2, combined with future adjacent projects could also enhance driving for pleasure opportunities by contributing to a larger and more attractive road network. The effects are cumulative because more extensive recreation attractions are more conducive to recreation opportunities than those that are smaller and more isolated (Stensland 2013).

The Magone Lake restoration activities proposed under alternative 2 could have a cumulative effect on recreational fishing. An improvement of fishing habitat could increase resiliency of fish populations, while simultaneously improving fishing opportunities. Improved fishing opportunities could in turn, result in increased visits to the Magone Lake recreation area.

Future trail developments are being proposed to the east of the Magone project planning area in the Camp Lick project planning area. If the proposed trail developments under alternative 2 are constructed, the effect could be a more extensive network of trails, which would have the potential effect of attracting more visitors to the area. Attracting more visitors to the area could have impacts to the local recreational facilities as well as have an environmental impact due to the effects of increased forest visits and facility usage. It is expected that attracting more forest visitors to the local area would have a beneficial economic effect on the local communities (Barthlow and Moore 1998).

### *Consistency with the Malheur Forest Plan*

The trail development proposals under alternative 2 meet the objectives of the Malheur Forest Plan (USDA Forest Service 1990a). As described below, the trail development proposals fall below the ROS threshold defined in the Recreation Resource Element Standard for each of the management areas that the proposed developments would cross. Most of the proposed trails are within General Forest (Management Area 1 (MA-1)) or Visual Corridors (MA-14).

- MA-1 Standard 1 is to *"Manage dispersed recreation for roaded modified conditions."*
- MA-14 Standard 1 is to *"Manage for roaded natural recreation."*

The other management areas that have proposed trail developments in them are Wildlife Emphasis Area (with Non-Scheduled Timber Harvest) (MA-21), Big-Game Winter Range Maintenance (MA-4A), and Old Growth (MA-13).

- MA-21 Standard 1 is to *"Manage for semiprimitive motorized recreation on designated roads and trails. Manage for semiprimitive nonmotorized recreation on the remainder of the area."*
- MA-4A Standard 1 is to *"Manage for recreation ranging from semiprimitive to roaded modified, depending on ROS objective for adjacent land."*

- MA-4A Standard 2 is *"Access by motorized recreational vehicles will be prohibited December 1 to April 1, except for designated routes through winter range which are compatible with the management area emphasis."*
- MA-13 Standard 1 is to *"Provide dispersed recreation setting consistent with adjacent lands."*

Under alternative 2, 2.0 miles of the new construction portion of the McClellan trail would be located along the eastern edge of the Wildlife Emphasis Area. Round Top is the only new construction trail that would cross through Big-Game Winter Range (5.5 miles total). It would cross five segments, with most of the distance in the southeastern most portion of the trail. Two segments of the Jugow trail (1.1 miles total) would cross Old Growth.

### 3.3.2.5 Alternative 3

*Direct and Indirect Effects*

**Direct and Indirect Effects to Recreation**

**Silviculture Treatments** – Under alternative 3, 13,378 acres would be treated across 348 units. The effects of proposed silvicultural treatment within the Magone project planning area under alternative 3 are similar to those described under alternative 2 in impacts to recreation. Site specific recreation experiences notwithstanding, the effects vary only slightly in the degree that developed or dispersed recreation would be directly affected. Each prescription would open up the understory, which would facilitate cross-country hiking through the forest as well as enhance the viewing opportunities during such treks (see Visuals Report). Alterations to the forest structure would also affect the movement of wildlife. Recreationists would find increased opportunities for wildlife viewing due to a more open forest structure. Ground fuels and fuel ladder reductions would improve the safety of recreationists at developed and dispersed recreation sites during the summer season. The effects of the silvicultural treatment activities under alternative 3 would be similar to alternative 2; however, with 13 percent more acres being treated under alternative 3, the effects of the activities would be slightly greater. Alternative 3 would have a direct effect on scenery and noise levels from activities such as cutting, skidding and decking logs, piling and burning non-commercial woody material and logging slash, and operating heavy machinery around and within the vicinity of the Magone Lake recreation area, trails, and dispersed campsites. The silvicultural treatments under alternative 3 would affect users of the existing recreational facilities during and after the time the activities take place. Visitors to the area, and specifically those hiking the trails, may be inconvenienced by the treatment activities when they occur. The Behind Magone trail, the southern portion of the Lake Butte trail, and the beginning segment of the Magone Slide trail could have a temporary reduction in recreational opportunities due to a significant amount of commercial and non-commercial thinning which could require temporary trail closures. The direct effects of the silvicultural treatment activities and associated noise, recreation area closures due to the activities, and the immediate evidence of ground disturbances could detract from the recreation experience. The silvicultural treatments that would occur adjacent to the lake could detract from the recreation experience of snowmobiling and ice fishing if the activity occurs over snow. However, the long term effects of a cleaner and more open forest floor and enhanced grass growth is expected to benefit the recreation experience. By 2 to 3 years after the primary mechanical activities occur, it is unlikely that the change in vegetation would be noticed by many forest visitors. The ground disturbance from the activities, including skid trails, would be much less evident after 2 to 5 years. Thus, the effects to vegetation and forest structure from the silvicultural treatments would have a minimal impact on the number of visitors to the area.

**Prescribed Burning** – Through fuel reduction treatments, alternative 3 would provide for the greatest reduction in fire risks to developed and dispersed recreation and the surrounding recreational setting. Although biomass removal and controlled burning may have short-term negative impacts on the recreational experience, severe fire could devastate the view shed and recreational opportunities, which would have a long-term impact on the corresponding recreational experiences. The activities under this alternative would help to restore historical forest structure, composition and density, and create more resistant and resilient vegetative conditions. Instead of deferring treatments, which would increase the risk of insect and disease infestations and high severity fire, alternative 3 would begin to address the need for restoration and enhance the recreational setting. Just as with alternative 2, planned ignitions under alternative 3 would take place on up to 28,500 acres, which includes all of the burn units in the project planning area. However, unlike alternative 2, the ignitions in burn units 6 and 7, which comprise most of the Nipple Butte IRA, have been confined to the fall only. Prescribed burning in the remaining units, 1 – 5 and 8, which cover the remainder of the proposed burning areas in the project planning area may occur in any season. The direct effect of these actions would be primarily on visuals (see Visuals Report); however, there would be indirect effects through vegetation enhancement, increased wildlife habitat and safety through fuels reduction. Prescribed burning may impact recreationists by creating smoke and through restricting access to the burn areas. Prescribed burning has the potential to affect hunters who want to access the area where the burning is taking place. Hunting and camping opportunities and experiences could be negatively impacted by the presence of smoke. The smoke and activity in the area could also have an effect on the presence or absence of big game. The Magone Lake campground and day use areas and the area immediately surrounding them are not included in the ignition units. However, smoke from the burning would have a short-term impact on recreationists in the Magone Lake recreation area when prescribed fire operations take place nearby (units 4 and 5). Recreationists may be impacted by the increased activity in the area, including an increase in traffic associated with the project, corresponding noise, and possible temporary road closures. Outside of the times when silvicultural and burning activities occur, alternative 3 would not directly affect the access roads to the Magone Lake recreation area. In the Grant County Community Fire Protection Plan, County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620 are designated escape corridors from Magone Lake and would receive fuel reduction treatments and thus remain safer for use as emergency ingress/egress routes.

**Road Activities** – Recreational use of forest roads would be minimally affected by changes in road closure status, as the affected roads are no longer contributing to integrated land management objectives. There would be fewer changes to road closure status than in alternative 2. Under alternative 3, only 0.3 miles of road would be closed across 2 road segments. 0.3 miles of road would be decommissioned across 1 road segment. 9.5 miles of road would be co-designated as trail, which is over twice as much as what is proposed under alternative 2. However, as in alternative 2, co-designating road as trail would not change the existing open road system. Alternative 3 would have the greatest benefit to recreational driving due to the largest distance of road maintenance that would occur as part of the silvicultural treatments and commercial harvesting activities. Road maintenance for hauling would occur on 98.5 miles of road across 105 road segments, a 27 percent increase over alternative 2. Temporary road activities for silvicultural treatments and harvesting under alternative 3 would be greater than under alternative 2. Under alternative 3, 13.3 miles of temporary road construction would occur and 46.9 miles of closed road would be temporarily opened for hauling. However, those temporary actions would have a minimal impact on recreation.

**Magone Lake Restoration Activities** – Under alternative 3, fish habitat improvements would serve to enhance fishing opportunities. Fish habitat would be improved through the placement of 15–20 fish cribs, as well as the placement of 70–100 "fish sticks"(logs that lay into the lake with one end on land) in singles and clusters of 5–7 trees mostly 8 to 12 inches diameter at breast height (DBH) throughout the lake. This could have the effect of distributing recreationists along the lake shore for fishing opportunities either between logs, or "fish sticks" to avoid the potential of snagging their fishing line, or on the logs as they locate their favorite "log dock" to go out on to cast their line. Although these fish habitat developments are intended to enhance fishing opportunities, they could have the effect of increasing fishing pressure. Under alternative 3, visitor use of the Magone Lake recreation area as a whole would be expected to slightly increase due to the new developments described above. The campground and day use areas at Magone Lake would remain below "people at one time" (PAOT) capacity during all but the busiest of summer weekends. During hot summer weekends, the PAOTs for day use at the recreation area may approach capacity, as swimming and other water related activities increase; however, that is driven by high temperatures and would not be an effect of the developments. Seasonal usage patterns might increase due to the improvements in water related recreation developments.

**Recreation Opportunity Improvements** – Trail developments under alternative 3 would substantially increase the hiking and bicycling opportunities in and around the Magone Lake recreation area. Under alternative 3, the Magone Lake recreation area could become a destination mountain biking area. New family oriented recreation opportunities would be created that would benefit those camping nearby. Hikers and mountain bikers from both the local communities and from outside of the area would receive new recreation opportunities as well. The opportunities would be created through 92.4 miles of new trail, improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road, and new trailheads near the junction of FSR 3618-064 and 3618-025 and at Four Corners. There would be 80.8 miles of new trail construction with all but 1.5 miles of it being hiking/bicycle trail. The remaining 1.5 miles, the North Magone Connector trail (0.1 miles) and the extension of the Magone Slide trail (1.4 miles), would be hiker only trails. A substantial portion, 10.2 miles, of the resulting trail system would still be trail co-designated on existing road. The new trail developments are compatible with the rustic character of the Magone Lake recreation area (see consistency with Malheur Forest Plan, below). Of the 80.8 miles of new trail construction under alternative 3, only 0.4 miles would be built within the Magone Lake recreation area. The new trail construction within the recreation area would be located outside of sight and sound distance of the most heavily used areas. It would fall well below the roaded natural characteristics of moderate evidence of the sights and sounds of humans and prevalent evidence of and moderate to high Interaction between users. However, disturbances to recreational experiences could still occur during the construction period due to activity generated noises. Outside of the Magone Lake recreation area, dispersed recreationists could encounter trail users in areas where under existing conditions, they would not have the encounter. It could potentially detract from the recreationist's experience of seclusion.

The new construction portions of the bicycle trails would be constructed to meet single-track mountain biking trail standards, as specified by the International Mountain Biking Association (IMBA) and adopted by Central Oregon Trail Alliance (COTA). Trail construction, maintenance, funding, and organization of such activities would be done primarily by the local COTA, Grant County Chapter through a formal agreement. The agreement would pertain to existing trails, as well as new ones. All the proposed trails would be designed as bicycle/hiker or hiker only. As such, motorized access would be prohibited. Engineering controls and education would be used foremost to prevent OHVs from accessing the trails.

Signage would be placed at trailheads to indicate the allowed modes of travel on the trails. Trail design techniques such as routing trails between large trees, and using bicycle width cattle guards at fence crossings would be used to discourage OHV use of the trails. Motorized access would continue to be allowed on the existing general purpose Nipple Butte trail. The trails would not be designed for equestrian use, but would not disallow it except for on the hiker only trails. Multiple use trail etiquette information would be provided at trailheads.

Under alternative 3, there would be more new trail mileage within the Nipple Butte Inventoried Roadless Area (IRA). The new IRA trail mileage includes the McClellan trail (6.5 miles of new construction in the IRA), also in alternative 2, which would go from the Nipple Butte trailhead to the southeast portion of the IRA. The McClellan trail would create a loop opportunity for hikers/bikers on the Jugow trail, offering outstanding scenic hiking and biking opportunities, and also allowing a loop opportunity on the Round Top trail by providing southern access to it. 2.0 of the 6.5 miles would be located along the eastern edge of the wildlife emphasis area. The Wade trail, which connects the McClellan trail to itself by cutting off the southern portion of the McClellan trail and creating a smaller loop, is the other trail with substantial IRA mileage (2.5 miles in IRA) that is also in alternative 2. Under alternative 3, the Porcupine trail (13.6 miles of new construction in the IRA) would connect to the McClellan trail in the center of the IRA, loop around to the west near Clear Creek before going north and crossing the McClellan trail near the Nipple Butte trailhead and continue on to the east all the way to the Lake Butte trail. 12.8 miles of the 13.6 in the IRA would be in the northwest portion of the IRA and the remaining 0.8 miles would be in the IRA's "thumb." The Porcupine trail would traverse through 1.1 miles of the northern edge of the Wildlife Emphasis Area. The trail would cross valleys and traverse ridges, providing a scenic recreation experience. It would be instrumental in creating a full array of loop hiking and biking opportunities within the IRA portion of the Magone project planning area. Also within the IRA would be 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border). 1.2 miles of the new construction portion of the Lake Butte trail would also be in the "thumb" of the IRA.

Due to the improvement and re-routes, bicyclists using the Nipple Butte or Lake Butte trails would no longer need to follow along County Road 18. This would eliminate the safety issue involved with bicycles encountering vehicle traffic. Connecting into the northern portion of the Lake Butte trail would be the Camp Lick Connector trail, which is a proposed short segment of trail with the purpose of tying the Magone trail system into the Eagle Rock trail, which is being proposed and would be primarily in the Camp Lick project planning area. Access to the Behind Magone trail would be enhanced by moving the start of the trail across from the Tinker Creek trailhead. Hikers and mountain bikers using the Behind Magone trail would be able to access it from the south end of the lake (near the outlet bridge) via the newly constructed trail segment, as well as from the Tinker Creek trailhead. The Magone Lake trail would be opened to bicycles (for a small segment of the trail) and hardened from the boat dock parking area to the new junction with the Behind Magone trail to prevent an increase in sedimentation. Access to the Behind Magone trail from the Tinker Creek trailhead would involve only needing to cross Forest Road 3618, rather than traveling along it. Hikers would also have access to the Behind Magone trail via the small North Magone Connector trail that connects to the Magone Lake trail at the north end of the lake. The Prohibition Loop, Porcupine Spur, Low Slope, Forest View, Outer Loop, Magone Connector, and Behind Magone Loop trails would serve to enhance the recreational opportunities near the Magone Lake recreation area by creating shorter loop options for hikers and bikers. The Round Top trail (19.7 miles) starts at the southern-most point of the McClellan trail and goes to the southeast across East Fork Beech Creek.

It then works its way east along the southern end of the Magone project planning area, crosses the northern flank of Round Top, then goes northeast to Four Corners. From Four Corners, it works its way back to the west, crossing FSR 3620 at Tinker Creek, then following FSR 3620-646 north and FSR 1800-311 west to the Lake Butte trail where it ends. The Round Top trail would, under alternative 3, provide many options for shorter and longer loops. Under this alternative there are several trails that connect to the Round Top trail to provide those loop opportunities. They are the Tinker Creek, Central Connector, East Fork Beech Creek, East Fork Beech Creek Cut-off, Four Corners Connector, South View, and East Project trails.

The complete new trail network under alternative 3 would likely cause the Magone Lake recreation area and the campground to become more popular and receive more visits. The new trail developments under alternative 3 would provide greatly increased recreational opportunities for visitors that would like to leave the campground for a small, moderate or long-distance hike or bike ride. They would be extensive enough to attract single track mountain bikers from nearby metropolitan areas such as Bend or Boise that would like to experience mountain biking with more solitude. Many active mountain bikers are willing to travel long distances in order to get a unique wild experience. They also tend to spend more money than less-active tourists. The network of new trails within the Magone project planning area, under alternative 3, would serve as an attractor of destination mountain bikers (MBOSC 2007).

Access to trails would be more inviting, safe and convenient due to new and better access to and improvement of trailheads, including better access roads and informational signing and graveled parking areas. The Nipple Butte and Tinker Creek trailheads would both be improved with graveled parking areas and informational signage. The improvement of the Tinker Creek trailhead would utilize the space of an existing dispersed campsite. The dispersed site, which would cease to exist, is the closest dispersed site to the Magone Lake recreation area. The newly constructed Four Corners trailhead would be constructed at the start of the closed FSR 1800-805. It would include a graveled parking area for four vehicles and informational signage. The Four Corners trailhead would provide access to the Magone trail system via the Round Top trail. It could also potentially be the start of the Four Corners trail, which is being proposed and would be primarily in the Camp Lick project planning area. Trail accessibility would be more convenient due to the relatively short distance to Four Corners from the local towns. This would provide increased opportunities for recreation when time is limited. The new trailhead at the junction of FSR 3618-064 and FSR 3618-125 would provide parking and close access to the IRA trails, as well as an alternative starting point near Magone Lake campground for access to the Lake Butte trail and all of its connecting trails. The trailhead would be located at the existing dispersed campsite, which would cease to exist, along FSR 3618-064. The gate across FSR 3618-064 would be moved back to a location just beyond the trailhead. This trailhead would serve to alleviate parking at day use areas within the Magone Lake recreation area. Signage to the trailhead would be placed at the junction of FSR 3618 and FSR 3618-064, which would increase usage of the road, including vehicle traffic to the trailhead that does not currently exist. Vehicle traffic on FSR 3618-064 would diminish the opportunity for relative seclusion along the road that is likely to be experienced under the other alternatives.

Under alternative 3, the Magone Lake recreation area would remain the centerpiece for recreation in the project planning area. Just as in alternative 2, the Magone Slide trail would be extended 1.4 miles around and over the top of the landslide creating a very scenic loop hiking opportunity. An interpretive sign on the east side of the lake would be placed where the Magone landslide that formed the lake is in view and would interpret the geology and history of the slide.

A sign with the same information about the landslide would be placed at the top of the slide alongside the extended Magone Slide trail.

About 0.2 miles of the existing Magone Lake trail would be fully developed to a class 5 (on the trail development scale) accessible trail from the campground to the north end of the lake. At the end of the trail improvement, a small area would be leveled and a picnic table placed. An interpretive sign describing the nearby beaver activity would also be located there. The trail improvement would not only improve accessibility to the north end of the lake, but would serve to fortify that segment of trail against any increased use that would occur. Since the stretch of Magone Lake trail that runs from the beach area to the campground is already fully developed, this improvement would be an extension of the accessible trail that currently exists. Thus, it would not affect the rustic character of the Magone Lake recreation area.

Recreation developments within the campground itself would remain as they currently exist. The boat launching dock would be modified and the boat mooring dock would be replaced, improving visitor boating opportunities. The boat launching dock would be modified for improved function, eliminating the inconvenient angle of the dock to the boat ramp. The boat mooring dock on the north end of the lake would be replaced and moved south so that boaters would no longer need to paddle through weeds to approach or leave the dock. Under alternative 3, a new fishing dock would be built on the east side of the lake, across the lake from where the accessible fishing dock is located. The new dock, the fourth on Magone Lake, would be built out of natural looking materials, so as to be rustic in character. It would provide additional fishing opportunities on the east side of the lake. Providing an additional location to fish from could enhance the fishing experience at Magone Lake. Currently, there are no developments on the east side of the lake, which gives it a more remote feel relative to the west side. The new dock has the potential to disrupt the remoteness, or at the least, affect the recreational experience of hikers on the Magone Lake trail. The dock would not be accessible, as the Magone Lake trail on the east side is not an accessible trail.

The proposed actions are intended to enhance the visitor experience by improving and creating recreational opportunities that are compatible with the recreation opportunity spectrum (ROS) and consistent with the Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan). Under alternative 3, the area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. Roaded Natural is “characterized by predominately natural-appearing environments with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities” (USDA Forest Service 1990a).

### Direct and Indirect Effects to Public Access

Alternative 3 would not directly affect the access roads to the Magone Lake recreation area. County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan, would receive fuel reduction treatments under this alternative. The reduction in fuels along these routes would have the indirect effect of increasing safety in the Magone Lake recreation area by decreasing the risk of uncharacteristic fire along these routes.

As stated above, recreational use of forest roads would be minimally affected with 0.3 miles of road being closed and 0.3 miles of road being decommissioned. Recreational driving would indirectly benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest.

### *Cumulative Effects*

Sights and sounds created by future silviculture, commercial harvest, and prescribed burning activities combined with the sights and sounds created by the Magone project implementation, would not have a cumulative effect on recreation. However, the resulting open forest structure resulting from those activities would. The resulting open forest structure from similar treatments, harvests and burns in future adjacent projects, combined with the Magone project would provide increased opportunities for viewing wildlife and other natural features, and create safer recreation opportunities by creating larger swaths of open forest. Creating larger swaths of open forest in the same area could enhance hiking, driving for pleasure and other recreation opportunities. The road maintenance that would occur under alternative 3, combined with future adjacent projects could also enhance driving for pleasure opportunities by contributing to a larger and more attractive road network. The effects are cumulative because more extensive recreation attractions are more conducive to recreation opportunities than those that are smaller and more isolated (Stensland 2013).

The Magone Lake restoration activities proposed under alternative 3 could have a cumulative effect on recreational fishing. An improvement of fishing habitat could increase resiliency of fish populations, while simultaneously improving fishing opportunities. Improved fishing opportunities could in turn, result in increased visits to Magone Lake recreation area.

Future trail developments are being proposed to the east of the Magone project planning area in the Camp Lick project planning area. If the proposed trail developments under alternative 3 are constructed, the effect could be a more extensive network of trails, which would have the potential effect of attracting more visitors to the area. Attracting more visitors to the area could have impacts to the local recreational facilities as well as have an environmental impact due to the effects of increased forest visits and facility usage. It is expected that attracting more forest visitors to the local area would have a beneficial economic effect on the local communities (Barthlow and Moore 1998).

### *Consistency with the Malheur Forest Plan*

The trail development proposals under alternative 3 meet the objectives of the Malheur Forest Plan (USDA Forest Service 1990a). As described below, the trail development proposals fall below the ROS threshold defined in the recreation resource element standard for each of the management areas that the proposed developments would cross. Most of the proposed trails are within General Forest (Management Area 1 (MA-1)) or Visual Corridors (MA-14).

- MA-1 Standard 1 is to *"Manage dispersed recreation for roaded modified conditions."*
- MA-14 Standard 1 is to *"Manage for roaded natural recreation."*

The other management areas that have proposed trail developments in them are Wildlife Emphasis Area (with Non-Scheduled Timber Harvest (MA-21), Big-Game Winter Range Maintenance (MA-4A), and Old Growth (MA-13).

- MA-21 Standard 1 is to *"Manage for semiprimitive motorized recreation on designated roads and trails. Manage for semiprimitive nonmotorized recreation on the remainder of the area."*
- MA-4A Standard 1 is to *"Manage for recreation ranging from semiprimitive to roaded modified, depending on ROS objective for adjacent land."*
- MA-4A Standard 2 is *"Access by motorized recreational vehicles will be prohibited December 1 to April 1, except for designated routes through winter range which are compatible with the management area emphasis."*
- MA-13 Standard 1 is to *"Provide dispersed recreation setting consistent with adjacent lands."*

Under alternative 3, 2.0 miles of the new construction portion of the McClellan trail would be located along the eastern edge of the Wildlife Emphasis Area. In addition, the Porcupine trail would traverse through 1.1 miles of the northern edge of the Wildlife Emphasis Area. The Round Top trail would cross through Big-Game Winter Range (5.5 miles total). It would cross five segments, with most of the distance in the southeastern most portion of the trail. East Fork Beech Creek (0.2 miles), East Fork Beech Creek Cut-off (0.2 miles), Four Corners Connector (0.7 miles), South View (1.5 miles) and East Project (3.1 miles) trails would also cross Big-Game Winter Range. One small section of the East Fork Beech Creek trail (0.2 miles) would skirt across the northern edge of an Old Growth area. Two segments of the Jugow trail (1.1 miles total) would cross Old Growth.

### 3.3.2.6 Alternative 4

*Direct and Indirect Effects*

**Direct and Indirect Effects to Recreation**

**Silviculture Treatments** – Under alternative 4, 5,505 acres would be treated across 152 units. The effects of proposed silvicultural treatments within the Magone project planning area under alternative 4 are very similar to alternative 2 in impacts to recreation. Site specific recreation experiences notwithstanding, the effects vary only slightly in the degree that developed or dispersed recreation would be directly affected. Each prescription would open up the understory, which would facilitate cross-country hiking through the forest as well as enhance the viewing opportunities during such treks (see Visuals Report). Alterations to the forest structure would also affect the movement of wildlife. Recreationists would find increased opportunities for wildlife viewing due to a more open forest structure. Ground fuels and fuel ladder reductions would improve the safety of recreationists at developed and dispersed recreation sites during the summer season. The effects of the silvicultural treatment activities under alternative 4 would be similar to alternative 2; however, with 53 percent fewer acres being treated in alternative 4, the effects of the activities would be much less. Alternative 4 would have a direct effect on the scenery and noise levels from activities such as cutting, skidding and decking logs, piling and burning non-commercial woody material and logging slash, and operating heavy machinery around and within the vicinity of the Magone Lake recreation area, trails, and dispersed campsites. The silvicultural treatments under alternative 4 would affect users of the existing recreational facilities during and after the time that the activities take place. Visitors to the area, and specifically those hiking the trails, may be inconvenienced by treatment activities when they occur. The Behind Magone trail, the southern portion of the Lake Butte trail, and the beginning segment of the Magone Slide trail could have a temporary reduction in recreational opportunities due to a significant amount of commercial and non-commercial thinning which could require temporary trail closures.

The direct effects of the silvicultural treatment activities and associated noise, recreation area closures due to activities, and the immediate evidence of ground disturbances could detract from the recreation experience; The silvicultural treatments that would occur adjacent to the lake could detract from the recreation experience of snowmobiling and ice fishing if the activity occurs over snow. However, the long term effects of a cleaner and more open forest floor and enhanced grass growth is expected to benefit the recreation experience. By 2 to 3 years after the primary mechanical activities occur, it is unlikely that the change in vegetation would be noticed by many forest visitors. The ground disturbance from the activities, including skid trails, would be much less evident after 2 to 5 years. Thus, the effects to vegetation and forest structure from the silvicultural treatments would have a minimal impact on the number of visitors to the area.

**Prescribed Burning** – Through fuels reduction treatments, alternative 4 would reduce the fire risks to developed and dispersed recreation and the surrounding recreational setting, but to a lesser extent than alternative 2. Although biomass removal and controlled burning may have short-term negative impacts on the recreational experience, severe fire could devastate the view-shed and recreational opportunities, which would have a long-term impact on the corresponding recreational experiences. The activities under this alternative would help to restore historical forest structure, composition and density, and create more resistant and resilient vegetative conditions. Instead of deferring treatments, which would increase the risk of insect and disease infestations and high severity fire, alternative 4 would begin to address the need for restoration and enhance the recreational setting. Under alternative 4, planned ignitions would take place on up to 17,200 acres. Burn units 6 and 7, which cover most of the IRA, are not a part of this alternative. Prescribed burning in the remaining units, 1 – 5 and 8, which cover the remainder of the proposed burning areas in the project planning area may occur in any season.The direct effect of these actions would be primarily on visuals (see Visuals Report); however, there would be indirect effects through vegetation enhancement, increased wildlife habitat and safety through fuels reduction. Prescribed burning may impact recreationists by creating smoke and restricting access to the burning areas. Prescribed burning has the potential to affect hunters who want to access the area where the prescribed burning is taking place. Under alternative 4, most of the Nipple Butte IRA would not be directly affected by the burning. However, the effects of smoke from the other burn units may still have an impact on the hunting experience in the IRA. The smoke and activity in the area could also have an effect on the presence or absence of big game. By not treating in the IRA, it could increase the chance of negatively impacting the Magone Recreation area by a severe fire. The Magone Lake Campground and day use areas and the area immediately surrounding them are not included in the ignition units. However, smoke from the burning would have a short-term impact on recreationists in the Magone Lake recreation area when prescribed fire operations take place nearby (units 4 and 5). Recreationists may be impacted by the increased activity in the area, including an increase in traffic associated with the project, corresponding noise, and possible temporary road closures. Outside of the times when silvicultural and burning activities occur, alternative 4 would not directly affect access roads to the Magone Lake recreation area. In the Grant County Community Fire Protection Plan, County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620 are designated escape corridors from Magone Lake and would receive fuel reduction treatments and thus remain safer for use as emergency ingress/egress routes.

**Road Activities** – Recreational use of forest roads would be minimally affected by changes in road closure status, as the affected roads are no longer contributing to integrated land management objectives. There would be fewer changes to road closure status than in alternative 2. Under alternative 4, only 0.3 miles of road would be closed across 2 road segments and 0.3 miles of road would be decommissioned across 1 road segment.

1.3 miles of road (in 3 road segments) would be co-designated as trail. As in alternative 2, co-designating road as trail would not change the existing open road system. Recreational driving would benefit due to the road maintenance that would be needed for the silvicultural treatments and commercial harvest. Road activities under alternative 4 would only be slightly less than under alternative 2. Road maintenance for hauling would occur on 77.2 miles of road across 77 road segments, the least amount under any of the action alternatives. Additional road activities for silvicultural and harvest activities would be 8.9 miles of temporary road construction and 28.5 miles of closed road that would be temporarily opened for hauling. Those temporary actions would have a very minimal impact on recreation.

**Magone Lake Restoration Activities** – Under alternative 4, fish habitat improvements would serve to enhance fishing opportunities. However, under alternative 4, there would be less fish habitat developments. Fish habitat would be improved through the placement of 5–10 fish cribs in two clusters, as well as the placement of 40–70 "fish sticks" (logs that lay into the lake with one end on land) in singles and clusters of 5–7 trees mostly 8 to12 inches diameter at breast height (DBH). This could have the effect of distributing recreationists along the lake shore for fishing opportunities either between logs, or "fish sticks" to avoid the potential of snagging their fishing line, or on the logs as they locate their favorite "log dock" to go out on to cast their line. With a smaller number of "fish sticks" planned under alternative 4, the distribution effect would be less than experienced under alternatives 2 and 3 due to a smaller number being placed. Although these fish habitat developments are intended to enhance fishing opportunities, they could have the effect of slightly increasing fishing pressure. Under alternative 4, visitor use of the Magone Lake recreation area as a whole would be expected to remain level or very slightly increase due to the new developments described above. The campground and day use areas at Magone Lake would remain below "people at one time" (PAOT) capacity during all but the busiest of summer weekends. During hot summer weekends, the PAOTs for day use at the recreation area may approach capacity, as swimming and other water related activities increase; however, that is driven by high temperatures and would not be an effect of the developments. Seasonal usage patterns might slightly increase due to the improvements in water related recreation developments.

**Recreation Opportunity Improvements** – Trail developments under alternative 4 would improve the hiking and bicycling opportunities in and around the Magone Lake recreation area. New family oriented recreation opportunities would be created that would benefit those camping nearby. Hikers and mountain bikers would receive new recreation opportunities. With substantially fewer trail developments under alternative 4, they are less likely to attract non-local hikers and mountain bikers than alternatives 2 or 3 would. The new recreation opportunities would be created through 11.9 miles of new trail, and improvements to the Tinker Creek trailhead and the Nipple Butte trailhead and its access road. There would be 9.4 miles of new trail construction with all but 1.5 miles of it being hiking/bicycle trail. The remaining 1.5 miles, the North Magone Connector trail (0.1 miles) and the extension of the Magone Slide trail (1.4 miles), would be hiker only trail. 1.1 miles of the new trail system would be trail co-designated on existing road. The new trail developments are compatible with the rustic character of the Magone Lake recreation area (see consistency with Malheur Forest Plan, below). Of the 9.4 miles of new trail construction proposed under alternative 4, only 0.2 miles would be built within the Magone Lake recreation area. The new trail construction within the recreation area would be located outside of sight and sound distance of the most heavily used areas. It would fall well below the roaded natural characteristics of moderate evidence of the sights and sounds of humans and prevalent evidence of and moderate to high Interaction between users.

However, a disturbance to recreation experiences could still occur during the construction period due to activity generated noises.

The new construction portions of the bicycle trails would be constructed to meet single-track mountain biking trail standards, as specified by the International Mountain Biking Association (IMBA) and adopted by Central Oregon Trail Alliance (COTA). Trail construction, maintenance, funding, and organization of such activities would be done primarily by the local COTA, Grant County Chapter through a formal agreement. The agreement would pertain to existing trails, as well as new ones. All the proposed trails would be designed as bicycle/hiker or hiker only. As such, motorized access would be prohibited. Engineering controls and education would be used foremost to prevent OHVs from accessing the trails. Motorized access would continue to be allowed on the existing general purpose Nipple Butte trail. Signage would be placed at trailheads to indicate the allowed modes of travel on the trails. Trail design techniques such as routing trails between large trees, and using bicycle width cattle guards at fence crossings would be used to discourage OHV use of the trails. The trails would not be designed for equestrian use, but would not disallow it except for on the hiker only trails. Multiple use trail etiquette information would be provided at trailheads.

There would be a small distance of new trail within the Nipple Butte Inventoried Roadless Area (IRA); 1.2 miles of the new construction portion of the Lake Butte trail would be in the “thumb” of the IRA. Also within the IRA, 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border) would be constructed. Under alternative 4 there is substantially less trail mileage within the IRA, and thus a return bicycle trail loop would not be available for the Jugow trail.

Under alternative 4, the new construction single track Jugow trail, the new connecting portion of the Lake Butte trail and the improvement and expansion of the Behind Magone trail would be the primary recreational improvements for mountain bikers. There would not be any recreation developments in the eastern half of the Magone project planning area, as the Round Top trail would not be constructed. The Behind Magone Loop trail would provide a small additional loop option for hikers and bikers near the Magone Lake recreation area. Due to the improvement and re-routes, bicyclists using the Nipple Butte or Lake Butte trails would no longer need to follow along County Road 18. This would eliminate the safety issue involved with bicycles encountering vehicle traffic. Connecting into the northern portion of the Lake Butte trail would be the Camp Lick Connector trail, which is a proposed short segment of trail with the purpose of tying the Magone trail system into the Eagle Rock trail, which is being proposed and would be primarily in the Camp Lick project planning area. Accessibility to the Behind Magone trail would be enhanced by moving the start of the trail across from the Tinker Creek trailhead. Hikers and mountain bikers using the Behind Magone trail would be able to access it from the southern end of the lake (near the outlet bridge) via the newly constructed trail segment, as well as from the Tinker Creek trailhead. The Magone Lake trail would be opened to bicycles (for a small segment of the trail) and hardened from the boat dock parking area to the new junction with the Behind Magone trail to prevent an increase in sedimentation. Access to the Behind Magone trail from the Tinker Creek trailhead would involve only needing to cross FSR 3618, rather than traveling along it. Hikers would also have access to the Behind Magone trail via the small North Magone Connector trail that connects to the Magone Lake trail at the north end of the lake.

Other than the Jugow trail, the trail developments under this alternative are limited to improving existing trails around and within the Magone Lake recreation area. The trail improvements would provide increased recreational opportunities for visitors that would like to leave the campground for a small to moderate hike or bike ride, but would not be extensive enough to attract visitors from outside of the local communities (MBOSC 2007).

Access to trails would be more inviting, safe, and convenient due to new and better access to and improvement of trailheads, including better access roads and informational signing and graveled parking areas. The Nipple Butte and Tinker Creek trailheads would both be improved with graveled parking areas and informational signage. The improvement of the Tinker Creek trailhead would utilize the space of an existing dispersed campsite. The dispersed site, which would cease to exist, is the closest dispersed site to the Magone Lake recreation area. Under alternative 4, there would not be any trails in the eastern portion of the Magone project planning area. Potentially connecting the Magone trails to the Camp Lick project at Four Corners would thus not be possible. The Four Corners trailhead would not be developed.

Under alternative 4, the Magone Lake recreation area would remain the centerpiece for recreation in the project planning area. The Magone Slide trail would be extended 1.4 miles around and over the top of the landslide creating a scenic loop hiking opportunity. The accessible trail along the north side of the lake described under alternatives 2 and 3 would not be developed under alternative 4. The picnic table would not be placed at the north end of the lake, and thus no ground leveling would occur. Accessibility would therefore not be improved around any portion of the lake. No interpretive signs would be placed. Recreation developments within the campground itself would also remain the same.

The boat dock modification and replacement would be the same under alternative 4 as they are in alternatives 2 and 3. The boat launch dock would be modified and the boat mooring dock would be replaced, improving visitor boating opportunities. The boat launching dock would be modified for improved function, eliminating the inconvenient angle of the dock to the boat ramp. The boat mooring dock on the north end of the lake would be replaced and moved south so that boaters would no longer need to paddle through weeds to approach or leave the dock.

The proposed actions are intended to enhance the visitor experience by improving and creating recreation opportunities that are compatible with the recreation opportunity spectrum (ROS) and consistent with the Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan). Under alternative 4, the area surrounding the Magone Lake recreation area would continue to be classified as Roaded Natural under the ROS. Roaded Natural is “characterized by predominately natural-appearing environments with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities” (USDA Forest Service 1990a).

**Direct and Indirect Effects to Public Access**

Alternative 4 would not directly affect the access roads to the Magone Lake recreation area. County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan, would receive fuel reduction treatments under this alternative. The reduction in fuels along these routes would have the indirect effect of increasing safety in the Magone Lake recreation area by decreasing the risk of uncharacteristic fire along these routes.

As stated above, recreational use of forest roads would be minimally affected with 0.3 miles of road being closed and 0.3 miles of road being decommissioned. Recreational driving would indirectly benefit due to road maintenance that would be needed for silvicultural treatments and commercial harvest.

### *Cumulative Effects*

Sights and sounds created by future silviculture, commercial harvest, and prescribed burning activities combined with the sights and sounds created by the Magone project implementation, would not have a cumulative effect on recreation. However, the resulting open forest structure resulting from those activities would. The resulting open forest structure from similar treatments, harvests and burns in future adjacent projects, combined with the Magone project would provide increased opportunities for viewing wildlife and other natural features, and create safer recreation opportunities by creating larger swaths of open forest. Creating larger swaths of open forest in the same area could enhance hiking, driving for pleasure and other recreation opportunities. The road maintenance that would occur under alternative 3, combined with future adjacent projects could also enhance driving for pleasure opportunities by contributing to a larger and more attractive road network. The effects are cumulative because more extensive recreation attractions are more conducive to recreation opportunities than those that are smaller and more isolated (Stensland 2013).

The Magone Lake restoration activities proposed under alternative 3 could have a cumulative effect on recreational fishing. An improvement of fishing habitat could increase resiliency of fish populations, while simultaneously improving fishing opportunities. Improved fishing opportunities could in turn, result in increased visits to Magone Lake recreation area.

Future trail developments are being proposed to the east of the Magone project planning area in the Camp Lick project planning area. If the recreation developments under alternative 4 are constructed, the effect would be a slightly larger network of trails. However, the Magone project trail system would not interconnect with foreseeable trail developments in the future project planning areas. Therefore, environmental impacts due to the synergistic effects of future trail developments would be very minimal.

### *Consistency with the Malheur Forest Plan*

The trail development proposals under alternative 4 meet the objectives of the Malheur Forest Plan (USDA Forest Service 1990a). As described below, the trail development proposals fall below the ROS threshold defined in the recreation resource element standard for each of the management areas that the proposed developments would cross. The proposed trails are within General Forest (Management Area 1 (MA-1)), Visual Corridors (MA-14), or Old Growth (MA-13).

- MA-1 Standard 1 is to “Manage dispersed recreation for roaded modified conditions.”
- MA-14 Standard 1 is to “Manage for roaded natural recreation.”
- MA-13 Standard 1 is to “Provide dispersed recreation setting consistent with adjacent lands.”

Two segments of the Jugow trail (1.1 miles total) would cross Old Growth. The rest of the proposed trails under alternative 4 are within General Forest or Visual Corridors. Unlike alternative 2, there are no proposed recreation developments or improvements in Wildlife Emphasis Area (with Non-Scheduled Timber Harvest) (MA-21) or Big-Game Winter Range Maintenance (MA-4A) in alternative 4.

## 3.4 Key Issue – Impacts to the Nipple Butte Inventoried Roadless Area (IRA)

The USDA Forest Service, Pacific Northwest Region (Region 6) covers approximately 27.2 million acres within the states of Oregon and Washington. This represents approximately 27 percent of the total acreage of both states combined. These 27.2 million acres are allocated and managed based on the land allocations designated within the respective National Forest System lands and resource management plans. However, two types of land designations are overriding and common among all units within the region (indeed the nation): the management of wilderness areas and inventoried roadless areas. In Region 6, there are approximately 4 million acres of inventoried roadless areas (15 percent) and approximately 5 million acres of wilderness (18 percent).

The Malheur National Forest is one of 16 administrative units that manage National Forest System lands within the Pacific Northwest Region. The Malheur National Forest covers approximately 1.7 million acres in the Blue Mountains of eastern Oregon. The Malheur National Forest contains approximately 83,000 acres of wilderness (5 percent of the Forest) and approximately 189,000 acres of inventoried roadless areas (11 percent of the Forest). The Forest consists of three ranger districts one of which is the Blue Mountain Ranger District.

The Blue Mountain Ranger District is approximately 707,000 acres in size and contains approximately 37,000 acres of wilderness (5 percent) and 95,000 acres of inventoried roadless areas (13 percent). The Magone project planning area is located in the northern portion of the Blue Mountain Ranger District. The Magone project planning area includes no wilderness areas, approximately 10,000 acres of inventoried roadless areas (IRAs) (37 percent of the project planning area), and 3,900 acres of other undeveloped lands (14 percent of the project planning area).

**Table 47. Wilderness and inventoried roadless areas in the Pacific Northwest Region, Malheur National Forest, Blue Mountain Ranger District, and Magone project planning area**

| Unit | Acres | Percentage |
|---|---|---|
| **Pacific Northwest Region** | 27.2 million | 27%[1] |
| Wilderness | 5 million | 18% |
| Inventoried Roadless Areas | 4 million | 15% |
| **Malheur National Forest** | 1.7 million | 6%[2] |
| Wilderness | 83,000 | 5% |
| Inventoried Roadless Areas | 189,000 | 11% |
| **Blue Mountain Ranger District** | 707,000 | 42%[3] |
| Wilderness | 37,000 | 5% |
| Inventoried Roadless Areas | 95,000 | 13% |
| **Magone project planning area** | 17,500 | 2.5%[4] |
| Wilderness | 0 | 0% |
| Inventoried Roadless Areas | 10,000 | 37% |
| Other undeveloped lands | 3,900 | 14%[5] |

[1] Portion (acres) of both Oregon and Washington that are National Forest System lands.
[2] Portion (acres) of USDA Forest Service Pacific Northwest Region that is managed by the Malheur National Forest.
[3] Portion (acres) of the Malheur National Forest that is managed by the Blue Mountain Ranger District.
[4] Portion (acres) of the Blue Mountain Ranger District within the boundary of the Magone project planning area.
[5] This number reflects the inventory of other undeveloped lands.

## 3.4.1 Existing Condition

### 3.4.1.1 Regulatory Framework

During public involvement for this project, and in past similar projects, a wide range of terms have been used by respondents, the courts, and the Forest Service when referring to these topics such as roadless, inventoried roadless area, unroaded, un-inventoried roadless, areas with wilderness characteristics, undeveloped lands, and roadless expanse. The terms and definitions as stated below will be used in this site-specific analysis. The four resource topics are based on current law, regulation, agency policy, and the Malheur Land and Resource Management Plan (Malheur Forest Plan), as amended (USDA Forest Service 1990a).

From the mid-1970s through 2001, the Forest Service maintained a roadless area inventory of undeveloped lands that we used and updated for RARE, RARE II, and in support of land and resource management planning completed in 1990 for the Malheur National Forest. During that period we called these polygons “roadless areas” or “inventoried roadless areas” (IRAs). With completion of the Roadless Area Conservation Rule (RACR) in 2001 these lands ceased being just an inventory, and IRA became more of a designation, with fixed boundaries and prohibitions set by Forest Service regulation (36 CFR 294). Confusion ensued because two Forest Service maps used the same name: IRA. One map had fixed boundaries set by the RACR and another map had changeable boundaries based on inventory criteria.

To address this situation, a 2006 amendment to the Forest Service Handbook (FSH) 1909.12 chapter 70, section 71 created a new term for the inventory of undeveloped lands called “potential wilderness areas” to make a clear distinction between the IRA term used by the 2001 RACR. A 2015 amendment to the FSH 1909.12 chapter 70, section 71 abandoned the potential wilderness area term.

The 2015 amendment to section 71 created new criteria to guide the identification of lands that may have wilderness characteristics. However, the inventory process for areas with wilderness characteristics is identified as a forest planning level analysis and is not intended to be conducted on a project-level basis.

The term “other undeveloped lands” is presented and used in this document to provide a consideration for the balance of those remaining lands that are not designated wilderness, were not designated as an IRA under the RACR, have not been identified at the forest planning level as areas with wilderness characteristics, and do not contain roads and evidence of timber harvest or roads. See the Other Undeveloped Lands section later in this chapter.

In the early 2000s, some local interest groups began creating their own inventories, including lands on the Malheur National Forest, using inventory criteria they developed for their purposes. Polygons on their maps are referred to as “inventoried roadless areas,” “roadless areas,” “unroaded,” or “un-inventoried roadless areas.” Confusion ensued again on this issue because there are conflicts between the Forest Service maps and maps presented by these interest groups. Each map appears to be based on different definitions and inventory criteria.

IRAs were identified in the 2001 Roadless Area Conservation Rule in a set of inventoried roadless area maps contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November 2000 (or any subsequent update or revision of those maps) which are held at the National headquarters office of the Forest Service (36 CFR 294.11). These areas were set aside through administrative rulemaking and have provisions, within the context of multiple use management, for the protection of inventoried roadless areas. Most inventoried roadless area boundaries are substantially identical to those identified as “Roadless Areas,” referred to in the 1982 planning rule (36 CFR 219.17) and identified by the Malheur Forest Plan, FEIS, Appendix C; however some localized, minor differences in boundaries may exist.

All roadless area acres were allocated to various management area strategies as disclosed in the Forest Plan FEIS, Appendix C and described in the Record of Decision (pages 14 to 17) for the FEIS. Some management area strategies were intended to retain the undeveloped roadless character of the roadless area and some management area strategies were intended to develop the lands with timber harvest and road building activities, thus foregoing roadless character.

#### 3.4.1.2 Nipple Butte Inventoried Roadless Area

The Nipple Butte IRA encompasses approximately 11,525 acres, with approximately 10,000 acres located within the Magone project planning area (approximately 37 percent of the project planning area). See Appendix B – Maps, Map 17. This IRA is characterized by steep, mountainous terrain, with elevations ranging from a high of 6,000 feet near Lake Butte to a low of 3,000 feet at the mouth of Clear Creek.

Lands with values and features that often characterize inventoried roadless areas are increasingly important within developed landscapes in order to provide clean drinking water and function as biological strongholds for populations of threatened and endangered species. They provide areas that are important for biological diversity, dispersed outdoor recreation, and also serve as bulwarks against the spread of non-native invasive species and provide reference areas for study and research (36 CFR 294, page 3245).

Within the Nipple Butte IRA human influences have had less impact on the natural appearance or long-term ecological process compared to managed lands. The current condition of soil, water quality, air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; noxious weeds, recreation; and cultural resources are described elsewhere in Chapter 3 of this DEIS. Disturbance by insects and fire has been and most likely will continue to be the factors with the most potential to impact the naturalness and undeveloped nature of the area. Opportunities for primitive recreation are limited to hiking, mostly cross-country, and hunting.

Livestock grazing, fire suppression, and dispersed recreation (i.e., hunting and camping) has occurred within the project planning area and surrounding vicinity for at least the past 100 years. Past timber harvest has also occurred within portions of the Nipple Butte IRA:

- In 1986, 77 acres was harvested in SADD SSTS Project, low vigor overstory and trees with heavy mistletoe infection were removed by tractor logging.
- In 1989, 14 acres harvested in Keen Salvage using crawler tractors and skidders, salvage of dead and dying trees experiencing mortality from western spruce budworm and bark beetle attacks.
- In 1990–1991, 8 acres experiencing pine beetle mortality was treated in Lake Lodgepole Project, live and dead lodgepole ≥4 inches were removed by tractor logging.

Additionally, approximately 200 acres of the Nipple Butte IRA were formerly owned by the Oregon Lumber Company (located in the “thumb” in the northeast part of the IRA and another piece in the northwest portion of the IRA); these lands were acquired by the Malheur National Forest in a land exchange in the 1940s. Ongoing firewood gathering and removal of danger trees along forest roads that border the IRA changes the vegetation, leaves stumps, and presents a managed appearance within a developed transportation corridor. Over the past several decades, fire exclusion has altered natural ecological processes. Suppression of fire in these areas helped create the stand composition and structure now present. In the dry upland forest, stands once dominated by open park-like stands of ponderosa pine have grown dense with the encroachment of shade-tolerant species such as Douglas-fir and grand fir. The scale of this situation across this landscape is uncharacteristic (un-natural) and unwanted.

Motorized off-highway vehicle use on designated trails and motorized use on existing Forest Service roads surrounding the IRA is apparent. Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of the IRA. Nearby, non-conforming sights and sounds of roads and timber harvest may be heard and seen from within the IRA.

The Malheur National Forest Land and Resource Management Plan Appendices – Final Environmental Impact Statement, Appendix C describes the Nipple Butte IRA as providing Roaded Modified (129 acres), Roaded Natural (691 acres), and Semiprimitive Motorized Recreation (10,705 acres) opportunities. See Appendix B – Maps, Map 16.

- **Roaded Modified** – Area is characterized by a natural environment that has been substantially modified by development of structures and vegetative manipulation. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.

- **Roaded Natural** – Area is characterized by predominately natural-appearing environment with moderate evidences of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
- **Semi-Primitive Motorized** – Area is characterized by a predominately natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present but would be subtle. Motorized recreation use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted. (USDA Forest Service 1990a, page VI-28)

#### 3.4.1.3 Condition of Forest Vegetation in the Nipple Butte Inventoried Roadless Area

Approximately 1/3 of the upland forested acres found in the Magone project planning area and almost half of the approximately 2,073 acres of Cool Moist PAG in the project planning area are located within the Nipple Butte IRA.Most stands within the Cool Moist PAG are mixed conifer. Species composition includes ponderosa pine, lodgepole pine, western larch, Douglas-fir, and grand fir. These stands are generally uneven-aged, with trees ranging from seedlings and saplings to large, old trees (300+ years). The large, old trees tend to be early seral, ponderosa pine, and western larch. However, large, old grand fir and Douglas-fir also exist in moist pockets and protected areas. Younger trees are predominantly grand fir, however, due to the productivity of these sites small openings in the canopy provide the conditions for natural regeneration of early seral species also. These stands tend to be very dense, have a high degree of structural diversity, and have many large diameter trees and snags. Currently, stem exclusion open canopy, old forest multi strata, and old forest single stratum are all above historic range, while understory reinitiation and young forest multi strata are well below the historical range of variability (Table 19). Late and old structure includes old forest single stratum and old forest multi strata. There is approximately 27 percent late and old structure within the Magone project planning area (Table 16). Over 50 percent of late and old structure in the Magone project planning area is located either in the Nipple Butte IRA or previously designated old growth areas.

Young pine stands are expanding from their historical extent within the Nipple Butte IRA. There are a few small aspen stands (approximately 0.5 acres in total) within the IRA, mostly within riparian habitat. These stands are being encroached upon by young ponderosa pine, and are currently much reduced from their historical extent. Young pine stands are also encroaching on ridges that have historically had mountain mahogany, and there is evidence of the pines shading out existing mahogany patches.

See Forest Vegetation section for additional information on the existing condition of forest vegetation in the Nipple Butte IRA and overall project planning area.

#### 3.4.1.4 Fuel Loading and Crown Fire Potential in the Nipple Butte Inventoried Roadless Area

The northern portion of the Nipple Butte IRA has several stands with heavy fuel loadings[8] (see Appendix B – Maps, Map 25). Even with steep terrain and difficult access, fire suppression has been successful in the Nipple Butte IRA using aerial resources. Successful fire suppression has altered the natural succession of the area. Fuel loadings are uncharacteristically high as a result of suppression efforts and insect and disease-caused conifer mortality (USDA Forest Service 2010a).

Crown fire[9] potential exists along the roadless boundary, with the exception of the southeast corner (see Appendix B – Maps, Map 20). Fire suppression has altered the natural succession of the area. Under natural conditions, low-intensity fire would have selectively maintained ponderosa pine in the understory and prevented the encroachment of fir (USDA Forest Service 2010a). Fire-intolerant species, such as grand fir, growing in the understory exhibit dense crowns and grow in tighter spacing, creating a situation where crown fire can be initiated.

With difficult topography, limited access, and fuel loads increasing, successful suppression efforts would become more difficult to achieve. In the absence of treatment, the Nipple Butte IRA would likely succumb to wildfire or disease and insects in the foreseeable future. With treatment, resiliency could be built or maintained within the IRA and fire could one day be allowed to naturally function on the landscape.

#### 3.4.1.5 Condition of Aquatic Habitat in the Nipple Butte Inventoried Roadless Area

The majority of Clear, McClellan, and Thompson creeks that contain MCR Steelhead Critical Habitat and Westslope cutthroat trout are within the Nipple Butte IRA. In general, these streams are wide and shallow “dished out”, lack quality pools (greater than 2 feet deep), are dominated by large cobble, have too much fine sediment, and do not provide quality habitat complexity. Mean maximum water temperatures are above the suitable range for salmonid species present.

The lower most 3 miles of Clear Creek and McClellan Creek prior to their confluence with East Fork Beech Creek have stream gradients of less than 3 percent, wide valley bottoms, along with suitable spawning gravels that are currently being flushed out of the system. These areas contain the primary MCR Steelhead spawning areas within the Nipple Butte IRA. However due to their degraded condition only a fraction of their spawning habitat potential is being realized.

Large woody debris (LWD) objectives are not being met within the lower most 3 miles of the IRA and this is impacting spawning gravel retention, stream sinuosity, floodplain connectivity, and water retention within these areas. However, the streams that are the closest to meeting LWD objectives are within the upper reaches of the IRA and are not proposed for aquatic restoration activities. Many of these streams have stands of large trees with closed canopies stretching along the stream, and are therefore meeting shade objectives.

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[8] Fuel models are used to help describe and quantify surface fuel situations and estimate fire behavior. fuel models burn with differing intensities and rates of spread. Greater fireline intensities, increased mortality, and resistance to control efforts can all be expected in areas with higher fuel loads. Refer to the Fire, Fuels, and Air Quality section for more information.

[9] Crown fires are generally considered the primary threat to life, property, ecological, and human values. Crown fire occurs when surface fire creates enough energy to preheat and combust fuels well above the surface (Agee and Skinner 2005). Crown fires are typically faster moving than surface fires, more difficult to suppress, and pose the greatest threat to firefighter safety from increased fireline intensities and long distance spotting.

#### 3.4.1.6 Condition of Wildlife Habitat in the Nipple Butte Inventoried Roadless Area

The 5,795 acre Nipple Butte Wildlife Emphasis Area (WEA; Management Area 21) is located entirely within the Nipple Butte IRA. Although Habitat Effectiveness Index and cover requirements are meeting or exceeding Malheur Forest Plan standards, cover requirements are not always compatible with the historical range of variability. This conflict is apparent in Hot Dry and Warm Dry forests dominated by ponderosa pine. Historical conditions and fire return intervals created large blocks of trees with canopy closure too low to be classified as satisfactory or marginal cover as defined in the Malheur Forest Plan. Today, cover requirements are being met on many ponderosa pine sites; however, stands are at a density level where mortality risk is high from both bark beetle and wildfires. Cover levels may not be sustainable. This inherent conflict may be even more relevant in winter range, which is often located in low elevation, Hot Dry and Warm Dry forests dominated by ponderosa pine. Unfortunately, tree thinning, the treatment that most effectively reduces beetle and fire risk, also reduces the effectiveness of a stand as cover.

Currently, the amount of forage and browse is below what it would have been historically, particularly in drier habitat types and along ridgetops. Lack of fire in adjacent habitat types has allowed juniper and other conifers to encroach into areas formerly dominated by mountain mahogany, bitterbrush, and other forage and browse species. In the Nipple Butte IRA, and throughout the project planning area, these species are being shaded out and lost. These habitats provide critical cover and forage for Rocky Mountain elk (Malheur Forest Plan Management Indicator Species) and mule deer, and provide habitat for a plethora of small mammals and birds including blue grouse (featured species) and red-naped sapsuckers (Malheur Forest Plan Management Indicator Species).

#### 3.4.1.7 Recreation Opportunities in the Nipple Butte Inventoried Roadless Area

The Nipple Butte IRA is a popular hunting destination. The southern portion of the IRA is a designated wildlife emphasis area (WEA) that comprises nearly half of the IRA that lies within the project planning area.

A portion of the Nipple Butte trail in the Nipple Butte IRA follows the Lake Butte/Nipple Butte ridge line and was cut straight up the slopes with no regard to contour. It follows a fence line, and in some cases, the trail is so close to the fence it is dangerous for bicycle riders. This portion of the Nipple Butte trail appears to have been placed primarily for fence maintenance. See Appendix B – Maps, Map 15.

### 3.4.2 Environmental Consequences

#### 3.4.2.1 Indicators for Assessing Effects

The measurement indicators detailed in Table 48 are used for assessing the effects of the Magone Project to the Nipple Butte IRA.

**Table 48. Resources indicators and measures for assessing effects to the Nipple Butte Inventoried Roadless Area (IRA)**

| Indicator | Measure |
|---|---|
| Impacts to roadless area characteristics | • High quality or undisturbed soil, water, and air<br>• Sources of public drinking water<br>• Diversity of plant and animal communities, habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land<br>• Primitive, semi-primitive, non-motorized and semi-primitive motorized classes of dispersed recreation<br>• Reference landscapes<br>• Natural appearing landscapes with high scenic quality natural integrity and apparent naturalness, solitude and remoteness<br>• Traditional cultural properties and sacred sites<br>Other locally identified unique characteristics or special features |
| Impacts from silviculture treatments | Acres and type of silviculture treatments in the Nipple Butte IRA |
| Impacts from prescribed burning | Acres and type of prescribed burning in the Nipple Butte IRA |
| Impacts from hiking/bicycle trails | Miles of hiking/bicycle trails in the Nipple Butte IRA |

### 3.4.2.2 Methodology

Information regarding the effects of prior harvest, including prior harvest lands acquired by the Forest Service, were discussed and reviewed with the project silviculturist. Based on field review and professional judgement, these lands still show evidence of past harvest, including stumps and vegetation conditions outside those expected and reflective of historical, pre-harvest conditions. Therefore, formerly private lands acquired by the Forest Service from lumber companies were excluded from analysis as other undeveloped lands.

### 3.4.2.3 Spatial and Temporal Context for Effects Analysis

The scale of analysis is the Magone project planning area and the Nipple Butte IRA.

The spatial contexts for this analysis are unit boundaries and the areas with associated road activities. The temporal context for the effects analysis is long-term, 5 to 50 years. Road decommissioning, new road construction, and silviculture treatments would have a long-term effect and may result in more or less other undeveloped lands.

### 3.4.2.4 Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past actions in or near the project planning area include timber management, fish habitat improvement, wildland fuels management, fire suppression, mining, dispersed camping, firewood cutting, and road and facilities construction and maintenance. All activities have affected current sream function and forest composition, structure, and overall management infrastructure within developed lands of the area. Therefore, these activities are still reflected (with individual variances) in the current condition of the area's natural resource and human environment values.

Foreseeable activities within the Nipple Butte IRA include aquatic restoration activities identified through Magone project planning that will be covered under the Aquatics Restoration Decision (USDA Forest Service 2014b). These activities include tree felling, large woody and coarse woody debris placement, and beaver dam analogs along approximately 4 miles of Clear and McClellan creeks.

### 3.4.2.5 Impacts to Roadless Area Characteristics in the Nipple Butte IRA

#### *Direct, Indirect, and Cumulative Effects of Alternative 1*

There would be no direct or indirect effects to the Nipple Butte IRA under the no action alternative because no activities would occur in the project planning area. The existing condition would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. Growth rates of trees would continue to decline, and natural processes that affect tree vigor and changes in stand structure would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within forest stands, which would result in larger acreages of blackened landscapes compared to prescribed fires. Some forest visitors may avoid blackened landscapes until green vegetation returns after 3 to 5 years. Fire is a natural occurrence and expected disturbance process in this landscape. Because there would be no direct or indirect effects under alternative 1 due to taking no action, there would be no cumulative effects to IRAs.

#### *Direct, Indirect, and Cumulative Effects of Alternatives 2, 3, and 4*

Table 49 summarizes the activities proposed within the Nipple Butte Inventoried Roadless Area (IRA) by alternative.

**Table 49. Summary of proposed activities within the Nipple Butte Inventoried Roadless Area by alternative**

| Project activity | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|
| Commercial and non-commercial thinning | 11 acres | 306 acres | None |
| Non-commercial thinning | 2,908 acres | 2,915 acres | None |
| Non-commercial thinning with designation as Replacement Old Growth (ROG) | 746 acres | 10 acres | None |
| Conifer reduction in aspen stands | 0.2 acres | 0.6 acres | 0.6 acres |
| Prescribed burning | up to 10,112 acres (all spring or fall underburning) | up to 10,112 acres (1,405 acres spring or fall, and 8,707 acres fall only underburning) | up to 1,405 (all spring or fall underburning) |
| Road system changes | Convert 0.6 miles of road to trail<br>Close 0.9 miles of road and co-designate as trail<br>Close 0.2 miles of road | Close 0.2 miles of road | Close 0.2 miles of road |
| Trails | 19 miles hiking/biking trails<br>0.4 miles hiking only trail | 32.3 miles hiking/biking trails<br>0.4 miles hiking only trail | 7.2 miles hiking/biking trails<br>0.4 miles hiking only trail |

### Effects on Nine Characteristics of Inventoried Roadless Areas

***High quality or undisturbed soil, water, and air***

*Soil* – The effects on soils by alternatives 2 and 3 are expected to be indistinguishable in all respects, save the amount of acres treated or impacted. The actions in each alternative are essentially the same, differing only in their amount and location, and thus the amount and location of expected ground disturbance from harvest systems, trail construction, and fuels treatments. Since all of these actions under alternatives 2 and 3 would maintain a component of the original forest system, no measurable direct or indirect effects to soil productivity as it relates to nutrient cycling are expected. Effects comparisons, therefore, are based on acres of potential detrimental soil disturbance (and thus effects to site productivity) from treatments and the expected impact per acre associated with each. Alternative 2 is likely to result in the most detrimentally affected soils and effects to site productivity from disturbance related to approximately 3,660 acres of commercial and non-commercial thinning, and construction of approximately 19 miles of new trail, followed by alternative 3, with approximately 3,230 acres of commercial and non-commercial thinning, and construction of approximately 33 miles of new trail. All activities under alternatives 2 and 3 would be mitigated to result in compliance with standard and guidelines.

The effects on soils under alternative 4 are expected to be negligible. No measurable direct or indirect effects to soil productivity as it relates to nutrient cycling are expected. Effects comparisons, therefore, are based on acres of potential detrimental soil disturbance (and thus effects to site productivity) from planned activities. Compared with alternatives 2 and 3, alternative 4 would result in the least detrimentally affected soils and effects to site productivity. No silviculture treatments are proposed within the IRA under alternative 4. Decommissioning of 0.4 miles of closed road is expected to increase soil productivity. Trail development within the IRA is expected to detrimentally impact negligible acres of soil. All activities under alternative 4 would be mitigated to result in compliance with standard and guidelines.

*Water* – Analysis of hydrologic function and condition effects due to changes in road density and miles of road in RHCAs are most appropriately done at the subwatershed scale and are disclosed in the Watershed Report and section of this DEIS.

Several activities including juniper and other conifer encroachment felling, scattering of woody material, prescribed burning, and trail construction would occur in the Nipple Butte IRA. Scattering coarse woody material associated with the juniper and conifer felling and the trail construction would promote infiltration and slow overland flow. Hardened or bridged trail crossings and waterbars would control sediment and overland flow along trails. A layer of duff that would allow infiltration would remain after burning.

Prescribed burning in RHCAs is not expected to expose mineral soil because it would be expected to burn with low intensity. Low intensity fire is not expected to fully consume organic matter on the soil surface. Low intensity fire is not expected to burn wetter riparian vegetation; it would be likely to die out in the inner RHCAs. Consequently prescribed burning is not expected to contribute to watershed hazard or to detrimentally affect stream or riparian conditions under alternatives 2 and 3. Fuel loads in RHCAs where prescribed fire would not be used, such as a majority of the IRA under alternative 4, would remain high and would be similar to those described for alternative 1 and may result in high-severity burns locally under wildfire conditions.

*Air Quality* – Any smoke from prescribed fire treatments under alternatives 2, 3, and 4 would comply with the Oregon Smoke Management Implementation Plan and would be implemented following the guidelines in this plan.

***Sources of public drinking water***

There are no public drinking water sources identified in the Magone project planning area.

***Diversity of plant and animal communities; Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land***

Plants

Since known and potential locations for threatened, endangered, proposed, candidate, and sensitive plant species, and uncommon/important plant communities would be excluded from the proposed silvicultural or fuels treatment units, and would be avoided during construction of recreation trails and road decommissioning, there would be no direct or indirect effects under alternatives 2, 3, and 4. The potential spread of invasive plants would be minimized under alternatives 2, 3, and 4 with the implementation of project design criteria and mitigation measures described in Appendix C – Project Design Criteria.

Terrestrial Wildlife Species

*Proposed, Endangered, Threatened, and Sensitive Terrestrial Wildlife Species*: Gray wolves east of U.S. Highway 395, which includes the project planning area, were delisted as an endangered species in 2011 and fall under management by the Oregon Department of Fish and Wildlife. Alternatives 2, 3, and 4 would have no impact on potential gray wolf populations. Additionally, gray wolves are highly adaptable; therefore, management activities would be expected to have little effect on habitat use.

For all action alternatives, the project "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" for Pallid bat, Townsend's big-eared bat, fringed myotis, bufflehead, bald eagle, Lewis's woodpecker, white-headed woodpecker, and Johnson's hairstreak; and would have "No Impact" for American peregrine falcon and silver-bordered fritillary. In the long-term, alternatives 2 and 3 would have a "Beneficial Impact" on bald eagles, Lewis's woodpeckers, white-headed woodpeckers, and Johnson's hairstreaks.

*Management Indicator Species*: All action alternatives would meet the applicable standards and guidelines from the Malheur Forest Plan, as amended. All action alternatives would maintain persistent populations of primary cavity nesters, black-backed woodpeckers, Rocky Mountain elk, and old-growth dependent species. Implementation of any alternative would not result in significant, incremental adverse effects on MIS species or their habitat within the project planning area.

*Featured Species*: For Northern goshawk, habitat would remain above the historical range of variability (HRV) for old forest multi strata and approach HRV for old forest single stratum under all action alternatives. No loss of individuals would be expected from project activities under any action alternatives. In the mid- to long-term, goshawks would acclimate to the increased presence of humans or move to other suitable nesting habitat within or outside the project planning area. Therefore, no effects to goshawk viability would be expected from the implementation of any of the action alternatives.

For blue (dusky) grouse, all action alternatives contain project design criteria that follow Regional Forester's Eastside Forest Plan Amendment 2 standards for retaining grouse winter roost habitat. Action alternatives may affect grouse habitat, however, habitat would remain above the historical range of variability and no adverse effects would be expected to blue grouse habitat or populations from implementation of any of the action alternatives.

Nesting and foraging habitat for osprey within the project planning area is limited, and therefore there are no impacts expected to osprey that would result in a change in the number of individuals, populations or prey species as a result of any of the action alternatives.

*Neo-Tropical Migratory Birds/Landbirds*: Effects to neo-tropical migratory birds are variable depending on the habitat associations of the individual species and effects to habitats described above. Impacts to habitat for some species may occur from vegetation management of forests; however, due to the limited amount of area affected by the action alternatives, effects to neo-tropical migratory birds are expected to be minimal. It is expected that vegetation management activities may remove some snags and thus have a potential adverse effect on cavity nesting birds in certain areas. However, analysis has shown that all activities should leave amounts of dead wood sufficient for the needs of cavity-dependent species, and where needed, snags and down wood would be created. Disturbance from operations and smoke during the nesting period is also a concern for neo-tropical migratory birds. However, efforts would be made to reduce the impacts to nesting birds that may be present in the project planning area that may be directly impacted by broadcast burning operations by restricting operations to outside the spring breeding/nesting season to the extent possible. Overall, potential population numbers for grass and shrub nesting birds are expected to increase. Another benefit is the creation of some snag trees caused by scorching from burning activities; thus creating some foraging and nesting habitat for woodpeckers and secondary cavity nesters (see Wildlife Report and section).

Aquatic Species

*Proposed, Endangered, Threatened, and Sensitive Aquatic Species*: For all action alternatives, the project, "May Effect, Likely to Adversely Affect short-term; Beneficial Effect long-term" and "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" short-term; "Beneficial Impact" long-term" for Middle Columbia River steelhead; "May Effect, Likely to Adversely Affect" short-term; "Beneficial Effect" long-term for Middle Columbia River steelhead designated critical habitat.

*Management Indicator Species*: For all action alternatives, the project "May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species" short-term; "Beneficial Impact" long-term for Interior redband trout, westslope cutthroat trout, and Columbia spotted frog.

Effects to aquatic species and habitat are similar under all action alternatives. This is due to the same site specific project design criteria and mitigation measures being included in all of these alternatives. The differences in activities between action alternatives are not large enough to create any measurable difference downstream on aquatic species.

***Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation***

The Nipple Butte IRA is primarily designated for providing semi-primitive motorized recreation in the project planning area. The primary recreational use in the Nipple Butte IRA is likely big game hunting and other dispersed recreation activities (e.g., camping, hiking).

Effects to semi-primitive classes of recreation, including isolation from the sights and sounds of man, would be affected by the increase of human presence and activity during the time of proposed treatments (i.e., mechanical treatments, prescribed burning) under alternatives 2 and 3. Silviculture and fuels treatments would have a short-term effect on scenic values and use of dispersed hunting campsites. Smoke may reduce the quality of the experience for recreationists that may be in the area, but it would have a short-term effect. Sights and sounds of human activity would increase as mechanical timber harvest treatments and prescribed burns are implemented under alternatives 2 and 3. This increase of activity would be short-term, however, and at the conclusion of treatments the sights and sounds of human activity would revert back to pre-project levels. The short-term effects to semi-primitive classes of recreation would be increased human presence, sights and sounds of timber harvest machinery, and road improvements.

Effects under alternative 4 from silviculture and prescribed burning treatments would be greatly reduced since no silvicultural treatments are proposed under this alternative and prescribed burning would be implemented on only 1,405 acres within the IRA. Impacts from treatment outside of, but adjacent to the IRA would have short-term, negative impacts on recreational users within the IRA due to the sights and sounds of human activity (i.e., mechanical harvest treatments).

The opportunity to enjoy semi-primitive, non-motorized recreational experiences would increase within the Nipple Butte IRA in the long-term under the action alternatives. Under alternative 2, trail developments would greatly increase hiking and bicycling opportunities. There would be a moderate distance of new trail (19.4 miles) built within the Nipple Butte IRA. Under alternative 3, trail developments would be extensive and would substantially increase the hiking and bicycling opportunities with 32.7 miles of new trails within the Nipple Butte IRA. Trail developments, under alternative 4, would somewhat increase the hiking and bicycling opportunities with a small distance of new trail (7.6 miles) built within the Nipple Butte IRA. The addition of new, developed single-track trail for hiking and biking would result in a long-term decrease in the primitive recreation experience by introducing additional developed, semi-primitive recreation to the IRA.

***Natural appearing landscapes with high scenic quality; Reference landscapes***

Alternatives 2 and 3

Under alternatives 2 and 3 there would be some visual effects to the landscape. Stumps would be visible in all treated units within the IRA. Various lengths of new recreation trails would be constructed in both alternatives. However, the objectives and guidelines associated with the visual quality objectives for each management strategy intersecting a treatment area would be met. Short-term acceptable effects from treatments are recognized and long-term enhancement to the visual landscape is expected (see Chapter 3, Visual Resources section).

Under alternative 2, stands within the IRA with light fuel loads would remain about the same following treatment. The biggest effect would be a decrease in the number of stands with heavy fuel loads. It is anticipated the majority of acres with heavy fuel loads would shift to moderate fuel loads following treatment. The potential for sustained crown fire within the IRA would be minimized. Treatments proposed under alternative 2 (see Table 49) align with the Roadless Rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes of the current climatic period. 36 CFR 294.13(b)(1).

The beneficial effects within the Nipple Butte IRA under alternative 3 are similar to the effects described under alternative 2. Alternative 3 proposes additional mechanical treatments within the IRA (Table 49); combined with the proposed prescribed fuels treatments a slightly greater reduction in fuel loading and potential crown fire can be seen compared to alternative 2. Treatments proposed under alternative 3 align with the Roadless Rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes of the current climatic period. 36 CFR 294.13(b)(1).

Prescribed burning within these areas would change composition and structure of vegetation (see Chapter 3). For a few years burned areas would display a blackened color until grasses, brush, and herbaceous species recover. Dead trees, particularly small trees (saplings to poles) would be evident over a 5 to 10-year period. Few overstory trees are expected to be killed. Outside the burned areas, the conditions described in the existing condition for the Nipple Butte IRA would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

Landscape prescribed burning would require the construction of handline which would include the cutting of some small diameter trees, snags that pose a hazard to workers, and the limbing-up (pruning) of other trees incidental to prescribed burning activities. The sight of some random tree stumps left after handline construction incidental to prescribed burning activities could affect the natural appearing landscape and sense of solitude for some. This activity would not affect natural integrity because fire is a natural condition on the landscape and influenced the development of the forest community. Effects on apparent naturalness would be minimal and of short duration during implementation of the prescribed fire.

Alternative 4

Alternative 4 proposes no mechanical treatments in the Nipple Butte IRA. With the exception of the northeast corner of the IRA, no planned ignitions are prescribed either. Direct and indirect effects would be similar to those described in the no action alternative in untreated stands within the IRA. If timing and weather allow, management of unplanned ignitions would potentially reduce fuel loading and crown fire potential in the IRA. With the absence of mechanical treatments and relying solely on unplanned ignitions to manage fuels in the IRA, fuel and vegetation conditions would likely continue their departure from historical conditions and eventually succumb to the effects of wildfire or insects and diseases.

Under alternative 4, there would be limited direct visual effects to the landscape. New recreation trail construction would be visible in the northeast portion of the IRA. However, the objectives and guidelines associated with the visual quality objectives for each management strategy would be met. Short-term acceptable effects from treatments are recognized and long-term enhancement to the visual landscape is expected (see Chapter 3).

There would be no direct effect to the apparent naturalness, scenery, and sense of solitude and remoteness within the Nipple Butte IRA from timber harvest, mechanical fuel activities, and road construction because those actions are not proposed within the IRA under alternative 4. The sights and sounds of timber harvest and fuels treatment adjacent to the IRA would reduce a sense of naturalness several miles into the IRA during project operations but would not persist in the long-term. The conditions described in the affected environment for the IRA would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

***Traditional cultural properties and sacred sites***

All traditional cultural properties and sacred sites would be avoided under alternatives 2, 3, and 4. Therefore, there would be no direct or indirect effects to traditional cultural properties and/or sacred sites.

***Other locally identified unique characteristics***

There are no other locally identified unique characteristics in the Magone project planning area.

**Cumulative Effects**

For IRAs in which project activities would occur when combined with past, present, and reasonably foreseeable future actions, where project activities would occur, cumulative effects to soils; water quality; air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources are disclosed in Chapter 3 and specialist reports and are not reiterated here.

Under alternatives 2 and 3, silvicultural treatments would increase the numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. In the long-term (about 50+ years), alternatives 2 and 3 would result in the development of historical open conditions characterized by larger diameter trees, though more stumps would be present than currently exist. Fuels treatments and future wildfires would cumulatively change the composition and structure of vegetation, which could affect some forest visitor’s sense of naturalness and remoteness. For a few years burned areas would display a blackened color.

Outside of the burned areas, the conditions described in the affected environment would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

Under alternative 4, there would be no silviculture treatments, and fuels treatments would only be implemented on approximately 1,400 acres of the IRA within the project planning area. While the visual change under alternative 4 would be noticeably less than under alternatives 2 and 3 due to the lack of silviculture and fuels treatments across the entire IRA, this would lead to continued development of complex fuel loads in the long-term (about 50+ years). By 2055 the north half of the IRA, particularly the northeast corner, would be affected by crown fire should an ignition occur under the right conditions. Roadless area ecosystem characteristics within the IRA would continue to depart from historical composition and structures, leading to uncharacteristic effects if a wildfire were to occur during high or extreme fire danger.

The reasonably foreseeable future activities authorized by the Aquatic Restoration Decision would be visually evident in the first year(s) following treatment; however, these would soon blend in with the landscape and contribute towards the improved function of the treated watersheds. These activities would shift species composition and enhance riparian conditions along Clear and McCellan creeks within the IRA. Cumulatively, activities described under alternatives 2 and 3 and aquatic restoration activities would be widespread enough to reduce the risk of large-scale, stand replacement fire and epidemic insect outbreak across the IRA, enhancing the overall condition of the IRA. The treatments for conifer/ juniper and fuels would not only benefit wildlife but would also benefit MCR steelhead and regionally-sensitive Westslope cutthroat trout in conjunction with foreseeable aquatic restoration actions within the IRA.

### 3.4.2.6 Impacts from Silviculture Treatments in the Nipple Butte IRA

*Alternative 1 – No Action*

**Direct and Indirect Effects**

Without entering the Nipple Butte IRA, many acres of overstocked forest would be left unmanaged. Previous fire suppression and other activities have led to encroachment of species that would have been regularly thinned naturally. This has led to stocking levels and species different to what would have occurred historically.

Sixty (60) percent of the old forest structure (OFSS and OFMS) within the project planning area is within the Nipple Butte IRA. In the Hot Dry and Warm Dry plant association groups (PAGs), which cover 66 percent of the project planning area, if no actions are taken, those PAGs would double their current range, increasing overstocking in old forest types, which might lead to these areas having a greater chance of uncharacteristic wildfire or insect infestation. Younger structural stages would decrease over time in the Warm Dry and Hot Dry PAGs, decreasing to below HRV.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with OFSS moving in and out of HRV, OFMS exceeding HRV and increasing over time, and the younger strata decreasing over time (with YFMS and UR moving below HRV).

**Cumulative Effects**

Taking no action to reduce density or shift species composition through either mechanical methods or prescribed burning in this project keeps the area on its current trajectory and increases the risk of large-scale stand replacement fire and epidemic insect outbreaks.

### *Alternative 2*

**Direct and Indirect Effects**

The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV and young forest structure decreasing to be below or on the lower end of HRV.

**Cumulative Effects**

Aquatic Restoration Decision activities would shift species composition in some areas within the Nipple Butte IRA. Cumulatively, alternative 2 activities and Aquatic Restoration Decision activities would contribute to reducing the risk of large-scale, stand replacement fire and epidemic insect outbreak in the IRA.

### *Alternative 3*

**Direct and Indirect Effects**

The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055 and in the Hot Dry PAG SI would increase to be well above HRV in 2055, similar to what would be seen under alternative 2.

The pocket of Cool Moist in the “thumb” of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV, with more OFSS and less OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2.

**Cumulative Effects**

Aquatic Restoration Decision activities would shift species composition in some areas within the Nipple Butte IRA. Cumulatively, alternative 3 activities and Aquatic Restoration Decision activities would contribute to reducing the risk of large-scale, stand replacement fire and epidemic insect outbreak in the IRA.

*Alternative 4*

**Direct and Indirect Effects**

The majority of the Nipple Butte IRA is composed of the Warm Dry and Hot Dry PAGs, within which the old forest structure (OFSS and OFMS) would increase over time to be within (in the case of OFSS) or above HRV (in the case of OFMS). OFSS would increase more under alternative 4 and OFMS would increase less, in comparison to alternative 2. Young forest structure in the Warm Dry PAG would be below or on the lower end of HRV in 2055, similar to what would be seen under alternative 2; young forest structure in the Hot Dry PAG would also be below or on the lower end of HRV in 2055, in contrast to the increase in SI to well above HRV that would be seen under alternative 2.

The pocket of Cool Moist in the "thumb" of the IRA would follow the trends described above, with old forest structure increasing and remaining well above HRV, with substantually less OFSS and OFMS than would be seen under alternative 2. Young forest structure would decrease to be below or on the lower end of HRV, similar to what would be seen under alternative 2.

**Cumulative Effects**

Since no silviculture treatments would be authorized in the Nipple Butte IRA under this alternative, similar to the no action alternative, the area would stay on its current trajectory with an increasing risk of large-scale stand replacement fire and epidemic insect outbreaks.

### 3.4.2.7 Impacts from Prescribed Burning in the Nipple Butte IRA

*Alternative 1 – No Action*

**Direct and Indirect Effects**

The effects of no action in the Nipple Butte IRA would mirror the effects discussed in the Fire, Fuels, and Air Quality section under alternative 1. Successful fire suppression has altered the natural succession of the area. Fuel loadings are uncharacteristically high as a result of suppression efforts and insect and disease- caused conifer mortality. Under natural conditions, low-intensity fire would have selectively maintained ponderosa pine in the understory and prevented the encroachment of fire-intolerant species such as grand fir (USDA Forest Service 2010a).

By 2055 the north half of the IRA, particularly the northeast corner, would be affected by crown fire should an ignition occur under the right conditions (see Appendix B – Maps, Map 21). A crown fire in the northeast corner of the IRA could potentially spread south and directly affect the Magone Lake recreation area. A crown fire in this area would also affect several roads identified as safety corridors/escape routes in this planning area and adjacent planning areas.

Fuel loading in the Nipple Butte IRA in 2055 would also make fire suppression more difficult, which directly affects the ability to protect life, resources, and property. Moderate to heavy fuel loading is expected to comprise the majority of the Nipple Butte IRA (see Appendix B – Maps, Map 26). Lower fuel loading is predicted in the center of the IRA; however, the east and west boundaries are predicted to have moderate to heavy fuel loadings in 2055 with no action. One square mile of private land projects into the southwest corner of the IRA. This private land would eventually be surrounded by moderate to heavy fuel loads if no action is taken.

Smaller tracts of private land along the south and west borders of the IRA would be subject to increased fuel loading. Identified safety corridors/escape routes adjacent to the IRA would be affected by the increase in fuel loading as well.

Under the no action alternative, roadless area ecosystem characteristics within the IRA would continue to depart from historical composition and structures, leading to uncharacteristic effects if a wildfire were to occur during high or extreme fire danger.

**Cumulative Effects**

Past actions including fire suppression and grazing have contributed to the current conditions of fuels and departure from the natural disturbance regime. These past actions have resulted in increases in understory vegetation and surface fuels and changes in species composition and vegetative continuity. Canopy and ladder fuels have increased and the stands have grown to the point that crowns are becoming denser. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

In choosing the no action alternative, the effects of decades of fire suppression would compound with the present day decision to not take restorative action on the landscape. Over the next decade, vegetation would continue to move away from historical conditions. The increasing understory vegetation and ground fuels would diminish the viewshed, obstruct cross-country travel for recreationists, and diminish ecological resilience.

### *Alternative 2 – Proposed Action*

**Direct and Indirect Effects**

The beneficial effects of the proposed treatments in the Nipple Butte IRA mirror those described in the Fire, Fuels, and Air Quality section under alternative 2. Under alternative 2, stands within the IRA with light fuel loads remain about the same after treatment. The biggest effect would be a decrease in the number of stands with heavy fuel loads. It is anticipated the majority of acres with heavy fuel loads would shift to moderate fuel loads following treatment. Areas with moderate fuel loads are primarily located in the northern half of the IRA (see Appendix B – Maps, Map 27). Moderate fuel loads within the IRA are somewhat fragmented, and under treatments identified in alternative 2 would remain fragmented with the exception of the northeast corner. If a fire were to occur in the northeast corner of the IRA, there could be adverse effects to both the Magone Lake recreation area and portions of Forest Service road 18. At a minimum, adverse effects could include loss of visual quality and damage to infrastructure associated with the Magone Lake Campground with the potential for loss of life should escape routes like Forest Service road 18 be compromised.

Under alternative 2, the potential for sustained crown fire within the IRA would be minimized (see Appendix B – Maps, Map 22). Two stands are expected to have potential for active crown fire. The majority of the potential for sustained crown fire is modeled as conditional crown fire fuel type. This is important because conditional crown fire is unlikely to occur unless an adjacent stand is modeled with active crown fire potential. Under alternative 2, stands with the potential for active or conditional crown fire are scattered about in the IRA. This would aid in minimizing the adverse effects of crown fire within the boundary of the IRA. Adverse effects of crown fire could be loss of life, resources, and property.

Treatments proposed under alternative 2 align with the roadless rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1).

**Cumulative Effects**

Past actions including fire suppression and grazing have contributed to the current conditions of fuels and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels and changes in species composition and vegetative continuity. Cumulatively, this project would reduce the potential for severe wildfire across the landscape. Fire suppression would continue as an ongoing activity and the probability of successful suppression would improve.

### *Alternative 3*

**Direct and Indirect Effects**

The beneficial effects within the Nipple Butte IRA are similar to the effects described under alternative 2. Alternative 3 proposes additional mechanical treatments within the IRA, and combined with the proposed prescribed fuels treatments a slightly greater reduction in fuel loading and potential crown fire can be seen compared to alternative 2 (see Appendix B – Maps, Maps 23 and 28). Stands not treated would have similar effects to those described in the no action alternative.

Treatments proposed under alternative 3 align with the Roadless Rule where the cutting, sale, or removal of generally small diameter timber would restore or maintain ecosystem composition and structure, reducing the risk of uncharacteristic wildfire effects within the range of variability that would be expected to occur under the natural disturbance regimes under the current climatic period. 36 CFR 294.13(b)(1).

**Cumulative Effects**

Cumulatively, alternative 3 would further reduce the potential for severe wildfire across the landscape compared to alternative 2. Fire suppression would continue as an ongoing activity and the probability of successful suppression would improve slightly more with the treatments proposed in alternative 3.

### *Alternative 4*

**Direct and Indirect Effects**

Alternative 4 proposes no mechanical treatments in the Nipple Butte IRA. With the exception of the northeast corner of the IRA, no planned ignitions are prescribed either. Direct and indirect effects would be similar to those described in the no action alternative in untreated stands within the IRA. If timing and weather allowed, management of unplanned ignitions would potentially reduce fuel loading and crown fire potential in the IRA. A prescribed fire was modeled in the IRA under similar conditions that would be used to manage a wildfire. Comparing fuel load (see Appendix B – Maps, Map 26 and 29) there is little change in fuel loads between alternative 4 and the no action alternative within the boundary of the IRA. Similar results can be seen comparing fire type in Appendix B – Maps, Map 21 and 24.

With the absence of mechanical treatments and relying solely on unplanned ignitions to manage fuels in the IRA, fuel and vegetation conditions would likely continue their departure from historical conditions and eventually succumb to the effects of wildfire or insects and diseases.

**Cumulative Effects**

Cumulatively, alternative 4 would do less to reduce the potential for severe wildfire across the landscape compared to alternative 2. Fire suppression would continue as an ongoing activity; however probability of successful suppression would diminish in areas with fewer mechanical treatments as fuels continued to accumulate.

### 3.4.2.8 Impacts from Hiking/Bicycle Trails in the Nipple Butte IRA

*Alternative 1 – No Action*

**Direct, Indirect, and Cumulative Effects**

Attractive mountain biking opportunities would continue to be nonexistent. The Nipple Butte trail, which traverses straight up steep slopes along a fence line is more suitable for off-highway vehicles (OHVs) than bicycles, and would remain the only option for mountain bikers who want to experience more than a short trail ride on a closed road. OHV users, bicyclists and hikers on the Nipple Butte trail would continue to have their experiences affected by the presence or evidence of other user groups, as the trail would remain as a general purpose trail. The Nipple Butte trail would remain the only trail option for OHV users.

*Alternative 2 – Proposed Action*

**Direct and Indirect Effects**

Trail developments under alternative 2 would substantially increase the hiking and bicycling opportunities. There would be a moderate distance of new trail built within the Nipple Butte IRA. Most of the IRA trail mileage would be along the McClellan trail (6.5 miles of new construction in the IRA), which would go from the Nipple Butte trailhead to the southeast portion of the IRA. The McClellan trail would create a loop opportunity for hikers/bikers on the Jugow trail, offering scenic hiking and biking opportunities, and offer a loop opportunity on the Round Top trail by providing southern access to it. Two (2.0) of the 6.5 miles would be located along the eastern edge of the Nipple Butte Wildlife Emphasis Area. The Wade trail, which connects the McClellan trail to itself by cutting off the southern portion of the McClellan trail and creating a smaller loop, is the other trail with significant IRA mileage (2.5 miles in IRA). Also within the IRA would be 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border). Approximatley 1.2 miles of the new construction portion of the Lake Butte trail would be in the “thumb” of the IRA. See Appendix B – Maps, Map 10.

**Cumulative Effects**

If the proposed trail developments under alternative 2 are constructed, the effect would be a more extensive network of trails, which would have the potential effect of attracting more visitors to the area. Attracting more visitors to the area could have impacts to the local recreational facilities as well as have an environmental impact due to the effects of increased forest visits and facility usage.

### *Alternative 3*

**Direct and Indirect Effects**

Trail developments under alternative 3 would be extensive and would substantially increase the hiking and bicycling opportunities. There would be a substantial distance of new trail mileage within the Nipple Butte IRA. The new IRA trail mileage includes the McClellan trail (6.5 miles of new construction in the IRA), also in alternative 2, which would go from the Nipple Butte trailhead to the southeast portion of the IRA. The McClellan trail would create a loop opportunity for hikers/bikers on the Jugow trail, offering outstanding scenic hiking and biking opportunities, and also allowing a loop opportunity on the Round Top trail by providing southern access to it. Two (2.0) of the 6.5 miles would be located along the eastern edge of the Wildlife Emphasis Area. The Wade trail, which connects the McClellan trail to itself by cutting off the southern portion of the McClellan trail and creating a smaller loop, is the other trail with significant IRA mileage (2.5 miles in IRA) that is also in alternative 2. Under alternative 3, the Porcupine trail (13.6 miles of new construction in the IRA) would connect to the McClellan trail in the center of the IRA, loop around to the west near Clear Creek before going north and crossing the McClellan trail near the Nipple Butte trailhead and continue on to the east all the way to the Lake Butte trail. The Porcupine trail would cross valleys and traverse ridges, providing a scenic recreation experience. Approximately 12.8 miles of the 13.6 in the IRA would be in the northwest portion of the IRA and the remaining 0.8 miles would be in the IRA's "thumb". The trail would be instrumental in creating a full array of loop hiking and biking opportunities within the IRA portion of the Magone project planning area. The Porcupine trail would traverse through 1.1 miles of the northern edge of the Wildlife Emphasis Area. Also within the IRA would be 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border). Approximately 1.2 miles of the new construction portion of the Lake Butte trail would also be in the "thumb" of the IRA. See Appendix B – Maps, Map 11.

**Cumulative Effects**

If the proposed trail developments under alternative 3 are constructed, the effect would be a more extensive network of trails, which would have the potential effect of attracting more visitors to the area. Attracting more visitors to the area could have impacts to the local recreational facilities as well as have an environmental impact due to the effects of increased forest visits and facility usage.

### *Alternative 4*

**Direct and Indirect Effects**

Trail developments under alternative 4 would somewhat improve the hiking and bicycling opportunities. There would be a small distance of new trail within the Nipple Butte IRA; 1.2 miles of the new construction portion of the Lake Butte trail would be in the "thumb" of the IRA. Also within the IRA, 0.3 miles of the Magone Slide trail extension and 0.6 miles of the Jugow trail (just inside the northern border) would be constructed. Under alternative 4 there would be substantially less trail mileage within the IRA, and thus a return bicycle trail loop would not be available for the Jugow trail. See Appendix B – Maps, Map 12.

**Cumulative Effects**

If the recreation developments under alternative 4 are constructed, the effect would be a slightly larger network of trails. However, the Magone Project trail system would not interconnect with foreseeable trail developments in the future project planning areas. Therefore, environmental impacts due to the synergistic effects of future trail developments would be very minimal.

### 3.4.2.9 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The 2001 Roadless Rule states that the cutting, sale, or removal of generally small diameter timber is allowed if it is needed to maintain or improve one or more of the roadless area characteristics as defined in § 294.11. "To improve threatened, endangered, proposed, or sensitive species habitat" 36 CFR 294.13(b)(1)(i), or "to maintain or restore the characteristics of ecosystem structure, such as to reduce the risk of uncharacteristic wildfire effects, within the range of variability that would be expected to occur under natural disturbance regimes of the current climatic period" 36 CFR 294.13(b)(1)(ii).

The cutting, selling, or removal of timber from the IRA would occur through commercial thinning (alternatives 2 and 3), non-commercial thinning (alternatives 2 and 3), and felling of trees within aspen stands (alternatives 2, 3, and 4). The extent and amount of cutting, selling, or removal of timber varies with each alternative.

Generally small diameter timber is defined for the Magone Project as being relative to the size of trees within each treatment unit. The commercial and noncommercial thinning prescription will generally be from below, removing grand fir encroachment to protect the abundant large, old ponderosa pine and western larch within these stands. Commercial and non-commercial thinning would include trees 1 foot tall to 18 inches DBH, with an occasional tree up to 21 inches DBH. These trees are generally of small diameter because in areas proposed for commercial thinning, old trees range from 25 to 55 inches DBH, with a majority of them being between 25 to 40 inches DBH.

Non-commercial thinning would include trees 1 foot tall to 11 inches DBH through manual and mechanical methods. Approximately half of the non-commercial thinning would be removal of juniper encroachment and the other half would be removal of conifer encroachment to protect mountain mahogany, bitterbrush, grasses, and other browse species that provide important habitat to Rocky Mountain elk and mule deer. Non-commercial thinning would remove trees of generally small diameter and would leave larger trees as well as old growth juniper and ponderosa pine that range in size from 12 to 35 inches DBH.

Felling of trees within aspen stands would be completed for the purpose of removing conifer encroachment to protect existing aspen trees and stimulate suckering, as well as utilizing those trees for large woody debris within Clear, McClellan, and Thompson creeks (this activity is authorized under the 2014 Aquatic Restoration Decision (USDA Forest Service 2014b)). Aspen provides unique habitat for many wildlife species within coniferous forests, and it is currently much reduced from its historical extent. The overstory of most aspen stands on the Malheur National Forest are single-storied and even-aged with many close to the end of their natural life cycle. Conifer trees felled would be predominately ponderosa pine that range in size from approximately 14 to 21 inches DBH. Trees greater than 21 inches DBH that do not exhibit old tree characteristics would occasionally be felled for large woody debris to meet Forest Plan standards that specify 20 percent of the large woody debris (80-120 pieces per mile) would be greater than 20 inches in diameter (LRMP Amendment 29).

Trees that exhibit old tree characteristics would not be felled. Adding large woody debris into these streams would directly benefit Mid-Columbia River steelhead (threatened species) and Westslope cutthroat trout (Region 6 Sensitive species).

Conditions within the Nipple Butte IRA are similar to general forest land. Successful fire suppression efforts have led to an increase in fuel loads. The Malheur Forest Plan allows for planned ignitions to achieve resource management objectives. It also allows for prescribed fire from lightning ignitions to be used to allow fire to play its natural ecological role (USDA Forest Service 1990a, Standard 19, page IV-133). Applying mechanical treatments where possible, combined with prescribed fire, would help reduce the risk of uncharacteristic wildfire effects within the Nipple Butte IRA. Where mechanical treatments are not possible, exclusive use of prescribed fire would gradually move the IRA toward desired conditons.

# 3.5 Analysis Issue – Fire, Fuels, and Air Quality

## 3.5.1 Existing Condition

### 3.5.1.1 Regulatory Framework

*Malheur Forest Plan*

The Malheur Forest Plan includes forest-wide fire management direction consistent with other resource goals. The goals for fire management are to: 1) initiate initial management action that provides for the most reasonable probability of minimizing fire suppression costs and resource damage, consistent with probable fire behavior, resource impacts, safety, and smoke management, and 2) identify, develop, and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (USDA Forest Service 1990a, page IV–4).

*Malheur National Forest Fire Management Plan*

The Malheur National Forest Fire Management Plan (USDA Forest Service 2013) is an operational guide that defines how the fire management program will be implemented on the Forest. The following general forest-wide standards apply to National Forest System land administered by the Malheur National Forest. In some cases standards represent a minimum or maximum permissible level of an output or activity, and under some circumstances standards that are more restrictive may be applied, provided changes in outputs or effects on other resources do not occur. Forest-wide standards are intended to supplement, but in some cases may take the place of, national and regional policies, standards, and guidelines found in Forest Service manuals and handbooks and the Pacific Northwest Regional Guide. The Malheur Forest Plan includes the following standards related to fire and fuels:

- Utilize prescribed fire to meet land management objectives. Normally, plan human ignition sources for prescribed fire; when appropriate, utilize lightning ignition sources for prescribed fire (USDA Forest Service 1990a, chapter IV– pg. 45, Standard 180).
- Manage residue profiles at a level that will minimize the potential of high intensity wildfires and provide for other resource objectives in individual management areas (USDA Forest Service 1990a, chapter IV– pg. 45, Standard 181).

- Use all methods of fuel treatment as prescribed by site-specific analysis to achieve resource management objectives. Encourage utilization of wood residue as a priority treatment, consistent with long-term site productivity and wildlife habitat needs (USDA Forest Service 1990a, chapter IV - pg. 45, Standard 183).
- Integrate residue treatment with pest management practices (USDA Forest Service 1990a, chapter IV – pg. 45, Standard 184).

The fuels management portion states that the appropriate type and amount of fuel treatment is tiered to the Malheur Forest Plan management area specific standards and goals. Levels and methods of fuel treatment will be guided by the protection and resource objectives of each management area. Emphasis will be on ecological restoration treatments. Where appropriate, fuels treatments will allow for the utilization of wood residues.

### *National Fire Plan*

The National Fire Plan (USDA Forest Service and USDI Bureau of Land Management 2001, 2002, 2006) provides national direction for hazardous fuel reduction, restoration, rehabilitation, monitoring, applied research, and technology transfer. The agencies are developing a common strategy for reducing fuels and restoring land health in fire-prone areas. The Forest Service prepared a document outlining strategies for protecting people and the environment by restoring and sustaining land health: Protecting People and Sustaining Resources in Fire-adapted Ecosystems—A Cohesive Strategy (USDA Forest Service 2000). The 10-Year Comprehensive Strategy reflects the views of a broad cross-section of governmental and non-government stakeholders. It outlines a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on Federal, adjacent State, tribal, private forest and range lands. The Magone project planning area and the prescriptions being considered are part of this comprehensive management plan.

### *Grant County Community Wildfire Protection Plan*

The Grant County Community Wildfire Protection Plan (CWPP) provides for the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), and other federal agencies to consider the priorities of local communities for forest and rangeland management as well as hazardous fuel reduction projects. In the event of a wildland fire in the project planning area, the Grant County CWPP has identified two county roads and the Malheur National Forest has identified four additional Forest Service roads as potential escape route/safety corridors.

The objective along these safety corridors is to manipulate the existing vegetation in a way that moderates fire behavior, allowing safe travel for the public and suppression forces should the need arise to escape from an emerging wildland fire.

### *Regulatory Framework for Air Quality*

Air quality standards require that impacts be minimized, especially in class 1 airsheds and smoke sensitive areas. Mitigation measures should be used when appropriate and burning should be conducted in accordance with the state Smoke Management Plan (USDA Forest Service 1990a, Chapter IV, page 40).

The framework for controlling air pollutants is mandated by the 1970 Clean Air Act (CAA), as amended. The CAA was designed to “protect and enhance” the quality of air resources, and encourage reasonable actions for pollution prevention. State implementation plans are developed to implement provisions of the CAA, specifically the National Ambient Air Quality Standards.

Section 160 of the CAA requires measures “to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seasshores, and other areas of special national or regional natural, recreational, scenic, or historic value.” Stringent requirements are established for areas designated as class 1 airsheds, which include wilderness areas over 5,000 acres in existence before August 1977. Designation as a class 1 area allows only very small increments of new pollution above existing levels.

The Regional Haze Rule (40 CFR 51.308-309) requires states to establish goals for improving visibility in class 1 airsheds and to develop long-term strategies for reducing emissions of air pollutants that cause visibility impairment. The Regional Haze Rule requires smoke management programs to address visibility impairment in mandatory class 1 airsheds due to emissions from prescribed fire activities. The State has designated all class 1 airsheds sensitive to smoke during the visibility protection period, which is defined as July 1 to September 15, during which restrictions on burning apply for purposes of visibility protection.

Prescribed burning in Oregon is managed by the Oregon Department of Forestry (ODF) under the Oregon Smoke Management Plan (OSMP). The OSMP is intended to minimize smoke impacts by conducting forest burning under weather conditions that disperse smoke and direct smoke away from populated areas. Burning on National Forest System lands only occurs with prior approval granted by ODF.

### 3.5.1.2 Existing Condition

#### *Weather and Topography*

The Blue Mountains experience hot, dry east winds several times a month during the summer and fall. These winds have low relative humidity, can quickly dry the fine fuels that carry fire, and can be strong. Valleys that run east-west and have low saddles at their crest are likely to be affected by these winds more than north-south valleys or areas with more topographic definition. Local winds associated with differential heating of the landscape are important throughout the Blue Mountains: diurnal up-valley winds during the day and down-valley winds at night. Topographic influences interact with weather, but have direct effects on fire as well. Steep slopes are more likely to burn than flat ones, southerly aspects more than northerly, and ridgelines more than valley bottoms.

The Magone project planning area occupies two subwatersheds, East Fork Beech Creek and Grub Creek. The Grub Creek subwatershed is located in the southeast corner of the project planning area and drainages generally flow south into the upper John Day River. The remainder of the project planning area lies in the East Fork Beech Creek subwatershed with drainages generally flowing south then west into the main stem of Beech Creek before entering the upper John Day River. A maximum elevation of 6,240 feet at the northern boundary of the project planning area and a minimum elevation of 3,520 in the southwest corner of the project planning area creates the feel of a general south to southwest aspect. However, all aspects are represented in the project planning area. Slope steepness greater than 60 percent can be found throughout the project planning area, but generally, slopes are less than 40 percent. During fire season, days with high fire danger often see temperatures rise above 80 degrees Fahrenheit, relative humidity fall into the mid-teens, and winds exceeding 10 mile per hour (mph) generally out of the west to south. These weather conditions combined with the all too common dry or mostly dry lightning storms that occur in the summer months can present difficult challenges during suppression activities in the Magone project planning area.

### *Suppression and Protection*

Magone Lake, the most popular developed recreation resource on the Blue Mountain Ranger District, is located in the project planning area. Should a wildfire occur, the main travel routes accessing this popular recreation destination have been identified in the Grant County Community Wildfire Protection Plan or by the Malheur National Forest as potential escape route/safety corridors. All or parts of County Road 18 and County Road 32, and Forest Service road (FSR) 36, FSR 3618, FSR 3620, FSR 3640, and FSR 3947 make up these travel routes. The objective along these routes is to manipulate the existing vegetation in a way that moderates fire behavior allowing safe travel for the public and suppression forces should the need arise to escape from an emerging wildland fire. In addition to the Magone Lake recreation area, there are structures located within or adjacent to the project planning area, and approximately 25 miles of shared boundary between national forest lands and private lands.

Reducing the fuel loadings, fuel continuity, and the availability of ladder fuels keeps fire confined to the ground, reduces fire intensity, and reduces firebrands; all of which increase the ability to control fires. Reducing the threat of ignition from firebrands requires reducing fuels both near and at some distance from potential control lines or values to be protected. Ignitions may result from firebrands originating as far away as 1 kilometer (0.6 miles) or more (Cohen 2000). Threat from firebrands becomes greater the closer the fire moves to an area of concern, whether it is a control line or value at risk.

### *Existing Condition – Fire Risk*

Fire risk is the potential and frequency for wildfire ignitions, and is often defined as the number of fires per 1,000 acres per decade. Areas that have a fire start every 1 to 10 years are considered to have a high fire risk. The Magone project planning area has a high fire risk based on past starts of 1.26 fires per 1,000 acres per decade (mostly caused by lightning).

### *Existing Condition – Fire Hazard*

Fire hazard for any particular forest stand or landscape is the potential magnitude of fire behavior and effects as a function of fuel conditions (Peterson et al. 2005). Fire hazard most commonly refers to the difficulty of controlling potential wildfire. Fire behavior characteristics such as rate-of-spread, intensity, torching, crowning, spotting, fire persistence, or resistance to control are generally used to determine and describe fire hazard. As Brown et al. (2003) indicated; fire severity can be considered an element of fire hazard. Fire hazard must be reduced in order to protect life and property.

Large wildfire events burn quickly across the landscape and can consume hundreds to even thousands of acres in a single day. During extreme weather events, downhill fire running of up to 5 miles during one burning period are not uncommon on the Malheur National Forest. Suppression resources contain over 95 percent of fires to less than 10 acres. Those fires that escape initial containment usually are ignitions that occur when fuel moistures and atmospheric conditions allow for extreme fire behavior. This includes fires in areas of high contiguous fuel loads, fires not quickly or easily accessible, fires in areas that do not allow suppression resources to safely work in close proximity to the fire (no escape route and/or safety zone), or a combination of the above.

Escape routes and safety zones are critical for firefighter safety, allowing for suppression efforts that protect life and property. An escape route is an easily negotiated path to a safe area or safety zone where the fire would not post a threat to firefighters. In frequent fire regimes where fuels are light, fire burns quickly leaving behind a blackened area. Without the presence of other hazards, this area can provide an accessible safety zone for firefighters working directly on the fire's edge.

Fire behavior and severity depend on the properties of the various fuel strata and the continuity of those fuel strata. The fire hazard can be characterized by the potential for fuels to cause specific types of behavior and effects. Fuelbeds are classified into six strata: 1) tree canopy, 2) shrubs and small trees, 3) low vegetation, 4) woody fuels, 5) moss, lichens, and litter, and 6) ground fuels (duff) (Graham et al. 2004).

Fine fuels such as litter, duff, grasses, and small woody fuels (less than 3 inches diameter) have the most influence on the spread rate and intensity of fires. These fuels are used in fire behavior models developed for predicting the fire behavior of the initiating fire (Rothermel 1983). Coarse woody debris (more than 3 inches diameter) has little influence on spread and intensity of the initiating fire; however, they can contribute to development of large fires and high fire severity. Fire persistence, resistance-to-control, and burnout time (affects to firefighter and public safety, soil heating, and tree mortality) are influenced by loading, size, and decay state of large woody fuel. Torching, crowning, and spotting contribute to large fire growth and are greater where large woody fuels have accumulated under a forest canopy. Large woody fuel, especially containing large decayed pieces, are a suitable fuelbed for firebrands and can hold smoldering fire for extended periods of time (Brown et al. 2003). Spot fires can also be started in rot pockets of standing snags. The distance firebrands travel is dependent on size of the firebrand, wind speed, and height above ground of the firebrand source.

Crown fires are generally considered the primary threat to life, property, and ecological and human values. Crown fires occur when surface fires create enough energy to preheat and combust fuels well above the surface (Agee and Skinner 2005). Crown fires pose the greatest threat to firefighter safety from increased fireline intensities and long distance spotting. These risks force firefighters into an indirect suppression strategy, which increases acres burned and thus increases fire severity on the landscape.

Existing fuel conditions in the project planning area are a result of effective fire suppression for the past 75 to 100 years, timber harvest, and livestock grazing. There has been an increase in understory vegetation and surface fuels, a change in species composition, and an increase in the continuity of vertical and horizontal stand structure. As a result, the potential for crown fire has increased. Historical stand structure played an important role in maintaining fire-dependent forest types, such as ponderosa pine (Graham et al. 2004). Throughout much of the lower elevation grassland, woodland, and forest, grasses are one of the primary fine fuels that allow fire to spread. Livestock grazing has reduced the availability of these fuels since European settlement began (around 1850).

During a recent Insect and Disease Review (Speigel et al. 2014) conducted in the Magone project planning area, Entomologist Lia H. Speigel noted the following key findings:

- Most of the forest in the project planning area is overstocked.
- Many mixed conifer stands no longer resemble their historical assemblages and current vegetation is at risk of:
    - high severity fire,
    - defoliator outbreaks, and
    - bark beetle attacks.
- Many mixed conifer stands that are now dominated by grand fir and Douglas-fir show evidence of a large departure from their historical stand composition, structure, and density.
- The low density of large, old ponderosa pines and larches, and a much higher density of younger, smaller firs is evidence of historically fire-maintained, open, early-seral dominated stands.
- The evidence of prior dominance by early-seral ponderosa pine and western larch indicates historically frequent fires, where pine and larch could establish on mineral soil seedbeds.

### *Existing Condition – Fire Regimes*

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but includes the influence of pre-settlement burning (Agee 1993). Coarse-scale definitions for natural fire regimes have been developed and interpreted for fire and fuels management. The five natural fire regimes are classified based on average number of years between fires combined with the severity of the fire on the dominant overstory vegetation (Hann et al. 2003). The five regimes include:

- I – 0 to 35 year frequency and low to mixed severity (less than 75 percent of the dominant overstory vegetation replaced)
- II – 0 to 35 year frequency and high severity (greater than 75 percent of the dominant overstory vegetation replaced)
- III – 35 to 100+ year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced)
- IV – 35 to 100+ year frequency and high severity (greater than 75 percent of the dominant overstory vegetation replaced)
- V – 200+ year frequency and high severity

The fire regimes for non-forested vegetation are dependent upon the moisture regime and whether it is upland or riparian. The fire regime for these areas can be I, II, III, or IV (Table 50).

A study completed by Emily Heyerdahl in the Blue Mountains of eastern Oregon found the historical fire-return interval to be approximately 12 years in similar dry forest types as the ones found in the Magone Project. Frequent lightning and pre-settlement burning contributed to these frequent fires. The frequency of wildfires changed drastically in the late 1800s. The change to low frequency fire-return intervals may be due to a dramatic increase in sheep and cattle grazing during the 1870s and 1880s, which reduced the fine fuels (Heyerdahl and Agee 1996). Other factors that reduced the overall frequency of wildfire on the landscape are fire suppression improvements and increased access as more roads were constructed.

A separate study was completed by Diana Olson in 2000 to assess fire history and return intervals within riparian habitats. Using the same fire history data from Heyerdahl's study, along with sample plots within riparian areas, Olson found similar fire-return intervals within the riparian areas as that found in the upland forested areas (Olson 2000).

These frequent fires burned with low severity. Olson concluded that keeping fire out of the riparian ecosystem would continue to alter structure and vegetation composition.

Fire regimes have been identified for all plant associations occurring across the Blue Mountains. In addition, fire frequency with the percent of any fire that may be mixed severity or stand replacing has been identified for all plant associations in the Blue Mountains. Within the project planning area, approximately 52 percent of the plant associations are within the Warm Dry plant association group and in fire regime I, with an average fire-return interval of 22 years and up to 24 percent of any potential fire being stand replacing. Approximately 14 percent of the plant associations in the project planning area are within the Hot Dry plant association group and in fire regime I, with an average fire-return interval of 15 years and 10 percent of any potential fire being stand replacing. This information is displayed in Table 50. See the vegetation management section for more information on the plant association groups.

**Table 50. Magone project planning area fire regime summary**

| Fire regime group | Plant association group | Mean fire interval and replacement fire percentage | Percentage within project planning area |
|---|---|---|---|
| I | Hot Dry Upland Forest | 15 years and 10% | 14% |
| I | Warm Dry Upland Forest | 22 years and 24% | 52% |
| III | Cool Moist Upland Forest | 59 years and 30% | 8% |
| III | Warm Moist Upland forest | 59 years and 30% | 8% |
| IV | Cold Dry Upland Forest | 111 years and 67% | 4% |

Forested stands in the Magone project planning area have missed two or more fire cycles based on the mean fire intervals shown in Table 50 and many of these stands would not burn as a low severity surface fire. Fires would be mixed severity to stand replacing with detrimental effects to other resources that did not historically occur. Another ecological component that has changed and is contributing to the departure from the natural fire regime includes the vegetation condition. Tree densities are much higher and species composition has shifted to have a higher proportion of shade tolerant, fire susceptible fir. Insect and disease are contributing to tree mortality in the area that then contributes to surface fuel loading as trees fall to the ground.

### *Condition – Fuel Loadings*

Fuel models (FMs) are used to help describe and quantify surface fuel situations and estimate fire behavior. Criteria for choosing a fuel model involve assessing the fuel strata that will support the fire as it spreads and generates heat intensity. Where fuelbeds are fairly continuous with similar fuel characteristics, one model can provide a realistic representation of expected fire behavior. A brief description of the FM characteristics that exist in the project planning area and their representation follows:

- **FM 2** includes open shrub lands and ponderosa pine stands. Grasslands being encroached by conifers, as well as light understory development is typical. These stands may include clumps of fuels or small concentrations of dead down material that could generate higher intensity fire and may produce firebrands. Fire spread is primarily through the fine curing grass, dead herbaceous fuels, and litter. Grazing can reduce grasses, decreasing the potential fire spread where grass is the primary carrier.

- **FM 5** is made up of young brush. Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area.
- **FM 8** represents a closed canopy of short-needle conifers with a compact surface-fuel litter layer. Representative vegetation types are mixed conifers of lodgepole, Douglas-fir, subalpine fir, grand fir, and larch. The surface-fuel layer is mainly needles and occasional twigs with very little undergrowth. Fires are typically slow burning with low flame lengths. An occasional heavy fuel concentration may cause a flare up, but the chance of any erratic fire behavior is small. Only under severe weather conditions with high temperatures, extremely low relative humidity, and high wind speeds does this fuelbed pose a high fire hazard.
- **FM 9** areas have mature, closed canopy stands with small amounts of understory development. Fires spread through surface litter that has accumulated under more dense stands of ponderosa pine. Concentrations of dead-down woody material contribute to possible torching of overstory trees.
- **FM 10** represents an area in which there is a moderate loading of larger size fuel at the surface layer. In this model, fires burn in the surface and ground fuels with greater fire intensity than the other fuel models. The fuelbed contains a moderate loading of large size fuels from insect/disease, wind damage, or natural mortality. High heat intensity, torching, spotting, and crowning may be expected during wildfire events; resistance to control is high.
- **FM 11** is similar to FM 10 in that the primary fire carrier is larger woody debris but it has heavier loadings than FM 10. High heat intensity, torching, spotting, and crowning may be expected during wildfire events and resistance to control is high.
- **FM 12** is dominated by slash, much of it less than 3 inches in diameter. Rapidly spreading fires with high intensities capable of generating firebrands can occur. When fire starts it is generally sustained until a fuel break or change in fuels is encountered.
- **FM 13** is represented by a continuous layer of slash with much of the material greater than 3 inches in diameter. Fires spread quickly through the fine fuels and intensity builds up more slowly as the large fuels start burning. Active flaming is sustained for long periods and firebrands of various sizes may be generated. These contribute to spotting problems as the weather conditions become more severe.

The majority of the project planning area falls within a FM 2, 8, 9, or 10 depending on whether grass or woody debris is the carrier of fire. These fuel models burn with differing intensities and rates of spread. Please refer to the fuel model descriptions above.

Surface fuels vary widely across the project planning area. An inventory of surface fuels was completed with silvicultural stand exams (see Magone Silviculture Report).

The majority of the Magone project planning area has light fuel loads of less than 8 tons per acre (Table 51). However, many of the forested stands identified as having moderate to heavy fuel loads are located adjacent to or within the Magone Lake recreation area and alongside designated safety corridors and the wildland-urban interface. Greater fireline intensities, increased mortality, and resistance to control efforts can all be expected in areas with higher fuel loads.

**Table 51. Magone project planning area fuel load summary**

| Total fuel loading | Percentage of project planning area |
|---|---|
| 0–8 tons/acre | 61% |
| 8–15 tons/acre | 17% |
| 15+ tons/acre | 22 % |

### *Existing Condition – Crown Fire Potential*

Crown fires are generally considered the primary threat to life, property, ecological, and human values. Crown fire occurs when surface fire creates enough energy to preheat and combust fuels well above the surface (Agee and Skinner 2005). Crown fires are typically faster moving than surface fires, more difficult to suppress, and pose the greatest threat to firefighter safety from increased fireline intensities and long distance spotting. These risks force an indirect suppression strategy, which increases acres burned and thus increases fire severity on the landscape resulting in more tree mortality and smoke production.

Crown fires are generally classified two ways:

- Passive crown fire occurs when single trees or small groups of trees torch. After the trees torch the fire returns to the surface.
- Active crown fire occurs when the fire moves through the crowns of adjacent tightly spaced trees until it reaches a more open stand or there are changes in topography or winds.

Both types of crown fire are dependent on the surface and ladder fuels for their initiation. The continuity and density of tree canopies in combination with wind and physical setting provide conditions required for rapidly moving crown fire. Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire. Reducing canopy bulk density by thinning is a means to minimize crown fire hazard. As surface fire intensity increases, or canopy base height decreases, it takes less wind to cause a surface fire to become a crown fire. As a stand becomes dense, active crowning occurs at lower wind speeds and the stand is more vulnerable to crown fire (Reinhardt et al. 2003).

Through past harvest activities and the effects of fire exclusion, stand structure in portions of the project planning area has moved from primarily single storied stands with large trees to overstocked stands with multiple stories of mid-size and small trees. Higher proportions of less fire-dependent tree species are occurring, such as grand fir and Douglas-fir. These species exhibit very dense crowns and grow in tighter spacing than the more fire-dependent ponderosa pine and western larch. Canopy base height is low enough and canopy bulk density is high enough in many forested stands that with current surface fuel conditions, there is potential for sustained crown fire on approximately 19 percent of the area (Table 52). Much of the larger ponderosa pine and western larch in the project planning area have smaller grand fir and Douglas-fir growing as ladder fuels underneath.

Models indicate some classification of crown fire is likely within and adjacent to the Magone Lake recreation area should a fire occur on days with hot, dry, and windy weather. Additionally, models indicate FSR 18, FSR 36, and the western boundary of the project planning area could likely experience extreme fire behavior under the conditions mentioned previously.

**Table 52. Magone project planning area existing crown fire potential by fire type**

| Fire type | Percentage of project planning area |
|---|---|
| Active crown fire | 12% |
| Crown conditional fire | 7% |
| Passive crown fire | 35% |
| Surface fire | 46% |

*Existing Condition – Air Quality*

Activities that would create smoke emissions must follow the Oregon Smoke Management Plan (OSMP).

The Strawberry Mountain Wilderness is a class 1 airshed located approximately 6 miles to the south of the project planning area. State of Oregon monitoring has not shown degraded visibility and protection periods from burning have not been set for class 1 airsheds in eastern Oregon. The towns of John Day (6 miles south), Baker City (50miles east northeast), and Burns (60 miles south) are listed in the OSMP as smoke sensitive receptor areas, and thus protected by the highest standard in the plan. Other small communities that could be affected by prescribed burning are Mt. Vernon to the south, Dayville to the west, Long Creek to the north, and Prairie City to the east.

Prevailing winds during times of prescribed fire activity typically range from northwest to southwest. During the day, diurnal heating forces air up-valley and up-slope, out of the area. During the night, air tends to sink down drainages and could potentially direct smoke into valley bottoms and temporarily affect air quality. Inversions affecting air quality occur mostly during winter months, but can develop other times of the year in the morning hours and dissipate by noon.

Currently, air quality conditions in surrounding smoke sensitive areas is limited to short-term effects resulting from wood burning, prescribed burning, and field burning. The greatest affect to the wilderness area is from field burning in the Willamette Valley and Central Oregon, as well as summer wildfires that occur to the south and west. These sources contribute to haze and can last for several days in spring and summer.

## 3.5.2 Environmental Consequences

### 3.5.2.1 Indicators for Assessing Effects

Reduce the fuel loadings by reducing the density and horizontal and vertical connectivity of standing vegetation, surface fuels, and/or ladder fuels to restore characteristics of ecosystem composition and structure to reduce uncharacteristic wildfire effects within the project planning area including the Nipple Butte Inventoried Roadless Area and wildland urban interface. Reduce fuels along County Road 18, County Road 32, Forest Service road (FSR) 36, FSR 3618, FSR 3640, FSR 3947, and FSR 3620, which are identified as escape corridors from Magone Lake in the Grant County Community Fire Protection Plan.

The measurement indicators detailed in Table 53, are used for assessing the effects to the transportation system in the Magone project planning area.

**Table 53. Fire, fuels, and air quality resource indicators for assessing effects**

| Objective | Indicator |
|---|---|
| Assess the potential for crown fire | Crown bulk density and canopy base height |
| Assess how fuel loading affects crown fire potential | Fuel loadings, crown bulk density, and canopy base height |
| Assess departure from natural fire regime | Missed fire return intervals |
| Assess air quality | Meeting the Clean Air Act and State and Federal air quality standards |

### 3.5.2.2 Methodology

See Silviculture section for a description of stand exams and FSVeg Data Analyzer program modeling methodology used in this section.

#### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

Past, present, and reasonably foreseeable future activities have been considered for their cumulative effects on fire and fuels. The areas considered for cumulative effects are the East Fork Beech Creek and Grub Creek subwatersheds. The time period considered for cumulative effects begins approximately 100 years prior to the initial operations and continues for 40 years. This time period includes potentially four fire cycles prior to and two fire cycles after if the area were in its natural fire regime. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to fire or fuels.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current conditions of fuels and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels, and changes in species composition and vegetative continuity. Past grazing reduced fine fuels at varying levels depending on the intensity of grazing which reduced potential fire spread. Past road construction enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Past mechanical treatments dating back to the early 1900s helped the project planning area retain its historical fire regime 1.

Cumulatively, this project would have a positive effect on protection of life and property and would reduce the potential for severe wildfire across the landscape. Fire suppression would continue as an ongoing activity and the probability of successful suppression would improve following the proposed treatments. Treatments adjacent to identified safety corridors would establish known anchor points and control lines allowing suppression forces to get ahead of advancing wildfires and complete indirect attacks.

Future grazing would continue to affect fine fuels. This can affect the implementation of prescribed fire and meeting objectives if the fuels (grasses) needed to carry fire are removed. Grazing management and fuels management need to coordinate to best meet their objectives. Some people have suggested that continued grazing would also shift the plant communities toward shrubs and trees. Local experience shows increases in tree stocking are not due to grazing but can be attributed to the past combination of timber harvest and fire suppression.

Future prescribed burning and management of natural ignition fires would be necessary to maintain fuels at desirable levels and limit ingrowth. The modeling for this project applied prescribed burning once in the first decade. By implementing a maintenance burning program (applying prescribed fire at regular intervals either planned or unplanned), crown fire potential would remain similar to that of the alternative 2. Regeneration would remain at sustainable levels, preventing increases in ladder and surface fuels.

Implementation of the travel management plan, a reasonably foreseeable future action, would not likely reduce the risk for man-caused fires in the project planning area. Past human-caused fires are 22 percent of all cause-documented ignitions. Most of the documented ignitions within the Magone project planning area have been lightning caused. Prior to 2002, cause was not recorded for fire starts within the project planning area. The travel management plan would not impede fire suppression personnel; they could still get to fires utilizing their suppression equipment (engines, crew vehicles, or aviation).

Emissions produced from prescribed burning under the proposed action would not exceed air quality standards. There is potential for prescribed burning to occur at the same time in nearby planning areas. Currently four project areas are located near the Magone project planning area. The Galena, Balance, 18 Road, and Big Mosquito projects all have signed decisions. Within the next three years, NEPA could be completed for the Camp Lick planning area. Total emissions produced from concurrent projects from 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 the cumulative effects. All burning would be coordinated to reduce cumulative effects and meet all applicable laws and regulations. Therefore, the cumulative effects of multiple prescribed burning projects would not cause air quality to exceed standards.

Future activities authorized under the Malheur National Forest Aquatic Restoration Decision (USDA Forest Service 2014b) include several riparian enhancement projects. The main emphasis on these riparian enhancement projects would be placing large and coarse woody debris in streams. Until conifer slash loads are reduced, there would be a short-term (5 to 10 years) adverse effect on fuel loading in the riparian areas where woody debris is placed in the stream. However, over time the riparian area would begin to function more effectively. A healthy riparian area acts as a natural fuel break to slow and help stop a wildfire. Underburning in the riparian areas would reduce conifer encroachment and stimulate growth of hardwoods.

Juniper, hawthorn, and aspen treatments are also authorized under the Aquatic Restoration Decision. Juniper and hawthorn will be felled and/or pushed over with the root ball intact and placed into the stream. Similar to the addition of large and coarse woody debris, there would be short-term adverse effects on fuel loading in the riparian area. Aspen treatments would include the removal of conifers up to 21 inches that are shading aspen stands. These conifers could be girdled to create wildlife snags or placed in the stream. Aspen are highly fire-adapted, but aspen-dominated communities do not burn readily (Jones and Debyle 1985). Aspen foliage is not highly flammable, and the moist herbaceous vegetation that typically forms the understory often would support only light ground fires or no fire at all. Severe fires in aspen are much more likely when there is a dense understory of shrubs or conifers (Jones and Debyle 1985). Like any healthy riparian area, healthy aspen stands can be used as natural barriers to stop the spread of wildfires.

Hardwood planting is another activity authorized under the Aquatics Restoration Decision and could increase live fuel loads by adding to the shrub layer in riparian areas. Once established and after some growth, these additional hardwoods would assist in keeping fuel moistures higher, provide more shade, and keep temperatures cooler in the riparian area, thus leading to low-intensity ground fires.

The remaining future activities to be completed under the Aquatics Restoration Decision, such as log weir removal or modification, legacy structure removal, storm proofing roads, spring development, riparian fencing, and beaver habitat restoration will not adversely affect fuel loads in the short-term. As these activities occur and stream function is restored, these healthy riparian areas would become useful fuel breaks to slow down or stop the spread of wildfire.

#### 3.5.2.3 Alternative 1 – No Action

This alternative would not reduce or increase fuels by commercial harvest, non-commercial thinning, mechanical surface fuels treatment, or prescribed fire. The effect of no action would be more difficult and less successful protection of life and property. Increased fuel loads would increase the potential for uncharacteristic crown fire behavior and fires would become more resistant to control efforts. Fire severity with detrimental effects to vegetation and soils would be high.

*Direct and Indirect Effects*

**Direct and Indirect Effects – Fire Hazard**

The effect of no action would be an increased potential for uncharacteristic crown fire behavior with greater resistance to control. The expected fire severity would increase for much of the project planning area because of increases in ladder fuels resulting from high stocking levels in the understory, low canopy-base height, and high canopy-bulk density.

Large ponderosa pine trees would continue to be vulnerable to mortality from wildfires due to deep accumulations of duff continuing to build around tree bases and an increase in ladder fuels. These trees are also threatened by overstocking, which would only increase under this alternative. Forested areas on Douglas-fir and grand fir sites that were historically dominated by ponderosa pine would continue toward their climax vegetation. Native shrubs and other native ground vegetation in the project planning area are adapted to low-severity fire. The absence of low-severity fire has had adverse effects on these plants, which have also been adversely affected by shading and competition from conifers. When wildfires occur, the severity would be greater with this alternative, possibly killing plants that would otherwise have the ability to sprout after a low-severity fire.

**Direct and Indirect Effects – Fuel Loadings**

If no action were taken, the project planning area would see an increase in the potential for stand replacing fires rather than the low-intensity/low-severity fires that would have occurred historically. Surface fuels including downed-woody material, needle litter, and duff accumulation would increase from current levels, contributing to the potential for stand-replacing fire and increased mortality.

In year 2055 the total area having a moderate fuel load would increase by 42 percent, while areas with a heavy fuel load would decrease by 5 percent. Areas with light fuel loads would decrease by 37 percent (Table 54). These departures from the existing condition and from the desired condition to models with heavier fuel loadings indicate fires would burn with high intensity and severity. As an example, fuel model 10 currently comprises 24 percent of the planning area and increases to 40 percent in 2055 under this alternative. Fuel model 13 does not exist in the project planning area at this time; however, models indicate that 2 percent of the area would be classified as fuel model 13 in 2055 under this alternative (see fuel model descriptions above). High heat intensity, torching, spotting, and crowning may be expected during wildfire events and resistance to control would be high. This makes protection of life and property more difficult and decreases chances of successful suppression efforts.

**Table 54. Fuel load in percentage of project planning area—existing condition compared to no action**

| Fuel load | Existing condition | No action – 2055 | Percentage change |
|---|---|---|---|
| 0-8 tons/acre | 61% | 24% | -37% |
| 8-15 tons/acre | 17% | 59% | 42% |
| 15+ tons/acre | 22% | 17% | -5% |

### *Ladder and Crown Fuels*

The continuity and density of tree canopies would provide conditions that enable rapidly moving crown fire. Overstocked stands would continue to slow in growth. Stand density would increase and tree vigor would decrease. The overall resiliency to withstand natural disturbances would continue to decrease. Late seral species would continue to increase in mixed species stands. Additionally, crown base heights would decrease and canopy bulk density would increase leading to greater potential for crown fire.

### Direct and Indirect Effects – Crown Fire Potential

Historically, this area had rather short fire-free periods that prevented high fuel loads to accumulate and limited the fuel strata within the stand. There would be a 3 percent increase in active crown fire potential and a 4 percent increase of crown conditional fire potential (Table 55).

**Table 55. Fire type in percentage of project planning area—existing condition compared to no action**

| Fire type | Existing condition | No action - 2055 | Percentage change |
|---|---|---|---|
| Active Crown | 12% | 15% | 3% |
| Conditional Crown | 7% | 11% | 4% |
| Passive Crown | 35% | 20% | -15% |
| Surface | 46% | 54% | 8% |

### Direct and Indirect Effects – Fire Regime

As stated earlier, fire regime 1 represents dry upland forest such as ponderosa pine and Douglas-fir plant associations, the Warm Dry plant association group (PAG), and comprises approximately 66 percent of the project planning area. A fire under current conditions would not burn as a low severity surface fire. Fires would be mixed severity to stand replacing with detrimental effects to other resources, which did not historically occur.

Vegetation condition is another ecological component that would contribute to the departure from the natural fire regime. Tree densities would continue to increase and species would continue the shift to higher proportions of shade tolerant, fire susceptible fir. Stand conditions would increase susceptibility to insect and disease effects, reaching levels that are highly departed from the natural fire regime. Forested stands in the project planning area would continue to depart further from the natural fire regime.

**Direct and Indirect Effects – Air Quality**

The no action alternative would have the least immediate effect on air quality, as no prescribed burning or pile burning would occur. Biomass would continue to accumulate and remain available for consumption by wildfires, increasing the potential for large amounts of smoke during the summer months when diurnal inversions can concentrate smoke at low elevations. Wildfires tend to occur at the driest time of the year; therefore, fuels are more completely consumed and typically produce three to five times more emissions than early- or late-season prescribed fires. There is potential during a wildfire for approximately 440 pounds per acre of PM2.5 emissions. These smoke concentrations can have high particulate levels that may cause health problems or violate summertime Class I air quality visibility standards for wilderness areas. The communities of Long Creek, Fox, Prairie City, Mt. Vernon, Austin, Bates, Unity, Kimberly, Monument, Sumpter, Hamilton, Dayville, and John Day could be affected by smoke from a wildfire in this area.

### *Cumulative Effects*

The following discussion focuses on those past, ongoing, and reasonably foreseeable activities that may contribute effects to fire or fuels. The area considered for cumulative effects are the East Fork Beech Creek and Grub Creek subwatersheds. The period considered for cumulative effects begins approximately 100 years in the past and continues 40 years into the future following implementation of the initial operations planned with this project.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current conditions of fuels and departure from the natural disturbance regime. These past actions have resulted in increases in understory vegetation and surface fuels and changes in species composition and vegetative continuity. Past road construction enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Commercial harvest since the early 1900s, followed by dense planting, has converted stands to more fire resistant tree species that are in the early seral stage, currently overstocked, and at risk to high mortality from fire. The lack of non-commercial thinning has increased canopy and ladder fuels and the stands have grown to the point that crowns are becoming denser and many acres are still overstocked needing additional fuel reduction treatments. Fire suppression would continue as an ongoing activity but would get increasingly more difficult as fuels increase.

Fuel treatments on other ownerships reduce the chance of a severe wildfire on those ownerships. Not treating this area does not contribute to landscape fuel reduction with those adjacent and nearby lands. No action in the project planning area affects other present and ongoing actions. If a wildfire were to burn at high intensity and severity all current and future actions would be affected.

### 3.5.2.4 Alternative 2 – Proposed Action

*Direct and Indirect Effects*

Alternative 2 proposes about 11,900 acres of mechanical treatment. Commercial activities are planned for about 4,700 acres and the remaining 7,200 acres would have non-commercial treatments applied. Prescribed fire would be applied to about 28,500 acres and planned ignitions could occur during any burn season, spring or fall (Table 56). Unplanned ignitions may be used like prescribed fire when fuel loading and weather conditions are appropriate.

Proposed treatments would help return the forest to a more resilient and sustainable condition. The overall effect would be a reduction of canopy, ladder, and surface fuels, which would contribute to the success of suppression and protection under most fire scenarios. Stands not receiving treatment would have effects similar to those discussed under the no action alternative. Crown or canopy fuels and ladder fuels would be treated by commercial harvest and non-commercial thinning. Surface fuels would be treated by hand or mechanical piling followed by burning of the piles, removal of slash for utilization (biomass), and/or underburning. Cram et al. (2006) observed that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity.

Prescribed fire burn blocks vary in size from 1,000 to 7,400 acres with boundaries identified along natural fuel breaks, such as existing roads and ridgetops (Table 56). The size, in acres, of a particular burn block does not represent how much of the landscape would be burned or blackened. Within each identified burn block there would be a number of unburned acres. Examples include open scabby areas, wet riparian areas, and north facing slopes in general. Additionally, much of the area where prescribed fire would carry is expected to burn in a mosaic pattern for a number of reasons. Fuel moisture, shading, grazing, and lack of continuous fuelbeds can lead to the mosaic burn pattern often created during prescribed fire operations (see Figure 30 below). Another factor limiting actual burned acres is design criteria limiting where active ignitions can occur within a particular burn block. Depending on weather conditions, fuel characteristics, and design criteria (see Appendix C – Project Design Criteria), the number of acres burned could vary from 50 to 80 percent of the proposed burn block size.

**Table 56. Magone Project burn blocks alternative 2**

| Burn block | Acres | Planned ignitions |
|---|---|---|
| 1 | 1,400 | Winter, spring, summer, or fall |
| 2 | 7,400 | Winter, spring, summer, or fall |
| 3 | 2,700 | Winter, spring, summer, or fall |
| 4 | 1,000 | Winter, spring, summer, or fall |
| 5 | 3,500 | Winter, spring, summer, or fall |
| 6 | 6,400 | Winter, spring, summer, or fall |
| 7 | 4,900 | Winter, spring, summer, or fall |
| 8 | 1,200 | Winter, spring, summer, or fall |
| **Total** | **28,500** | ***unplanned ignitions can be used any season** |

**Figure 30. Example of a mosaic underburn pattern.**

Non-commercial thinning of small diameter trees would also reduce ladder fuels and the continuity of the tree crowns. This is proposed within areas treated commercially and in areas where there is little commercial material but there is a need to remove the smaller trees.

Of the 27,000-acre project planning area, almost 50 percent of the area would be mechanically treated. The entire planning area would be treated with prescribed burning, which would burn in a mosaic pattern as described above. These treatments would break up the continuity of fuels across the project planning area.

Alternative 2 also addresses the need for treatment along safety corridors identified in the Grant County Community Wildfire Protection Plan (2005). The objective along these safety corridors is to manipulate the existing vegetation in a way that moderates fire behavior. The treatments proposed would allow safe travel for the public and suppression forces should the need arise to escape from an emerging wildland fire. Treatments along these corridors would also provide suppression forces with anchor points and better opportunities for stopping the spread of wildland fires.

### Direct and Indirect Effects – Fire Hazard

An overall effect of the proposed action would be a reduction of canopy fuels, ladder fuels, and surface fuels, which would contribute to successful fire suppression and protection of life and property under most fire scenarios. Mechanical fuel treatments that reduce ladder and canopy fuels would have a direct effect on canopy base height and crown bulk density. The continuity of the fuels within the project planning area would be broken up.

### Direct and Indirect Effects – Fire Regime

Fire regime 1, a low severity but high frequency regime, comprises approximately 66 percent of the project planning area (Table 50). Treatments would change vegetation characteristics including stand density, species composition, and structural stage. Treatments would also change fuel composition and potential fire severity, components relating to change from reference conditions.

After completion of all mechanical treatment (approximately 11,900 acres proposed) and prescribed burning (approximately 28,500 acres proposed) these stands would begin to resemble a more historical forest structure and pattern. Conducting maintenance burning throughout the project planning area would be important to continue moving stands toward a more historical condition and to maintain resiliency in those stands over time.

As untreated stands continue to miss fire return intervals they would continue to depart from historical conditions.

Treatments identified in alternative 2 would result in conditions that are more resilient to natural disturbance processes, including wildfire. The increased tree growth from thinning would cause the development of old forest structural stages to accelerate, allowing the thinned stands to grow into the large size classes sooner. As structure approaches the historical range of variability, and with continued maintenance burning to sustain low fuel levels, forest structure, composition, and density would move toward more resistant and resilient vegetative conditions given the historical fire regime.

**Direct and Indirect Effects – Fuel Loading**

There would be a short-term increase in fire hazard following treatment and prior to slash disposal when fuels remain in the units and on the ground. Existing surface fuels and created slash would be treated by one or a combination of methods. Whole tree yarding or yarding with tops attached would remove the slash to a landing for utilization or to be piled and burned. Other slash treatments would include handpiling or grapple piling followed by burning of the piles and/or applying understory prescribed burning. Any combination of slash treatments would facilitate a reduction in surface fuel loading. All units include treatments to reduce the surface fuels to mitigate the possible increase in surface winds and drier fuels. A prescribed burning program continuing into the future would be needed to maintain the desired fuel levels and limit regeneration from becoming a ladder fuel concern as well as a stand density concern.

Van Wagtendonk (1996) found in fire simulations that a reduction in fuel loads decreased subsequent fire behavior, increased fireline control possibilities, and decreased fire suppression costs. Efficient fireline construction rates are also enhanced where fuel reduction has occurred, which decreases resistance to control (Agee et al. 2000). Increased fireline control leads to enhanced firefighter safety.

The beneficial effects of prescribed fire on altering fuel structure and wildfire behavior and effects have long been observed and reported. Prescribed fire is a useful tool to alter potential fire behavior by influencing multiple fuelbed characteristics, including:

- Reducing loading of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels, which together with compactness and continuity change the fuel energy stored on the site and potential spread rate and intensity.
- Reducing the horizontal fuel continuity (shrub, low vegetation, woody fuel strata), which disrupts growth of surface fires, limits the buildup of intensity, and reduces spot fire ignition probability.
- Increasing compactness of surface fuel components, which retards combustion rates (Graham et al. 2004).

Prescribed burning often consumes some of the lowest ladder fuels and scorches the lowest tree branches, killing them, which raises the live crown above the ground surface. Prescribed burning can reduce fire intensity and severity from wildfires (Omi and Martinson 2002, Pollet and Omi 1999). The primary stand attributes that control fire behavior are surface fuel condition, crown bulk density, and crown base height (Graham et al. 1999). The objectives of utilizing prescribed fire are to reduce surface fuels, reduce litter and duff depth, and increase canopy base height by scorch of the lower limbs. Prescribed fire is not being utilized to change the structural stage of the stands. Some tree mortality is expected and acceptable in forested stands. In a study of the effects of low-intensity fires on ponderosa pine forests in Zion National Park, needle/litter fuel load layer was reduced by 54 percent, duff loading was reduced by 35 percent, and pole-sized trees were reduced by 18 percent (Bastian 2001). With the reduction in ladder fuels, there would be a reduced probability of a surface fire moving into the tree crowns.

Underburning is proposed in the entire project planning area. Warm Dry and Hot Dry biophysical environments (fire regime I) account for approximately 66 percent of the project planning area while Cool Moist/Warm Moist (fire regime III) accounts for 16 percent and Cool Dry (fire regime IV) accounts for 4 percent of the project planning area (Table 50). The remaining area that would be underburned is comprised of non-forest environments.

There are approximately 28,500 acres proposed for underburning. The stands being underburned outside of the mechanical treatment are in a condition that underburning is used to maintain and improve current conditions. The objective for the surface fuels is to reduce fuel loadings to desirable levels. Mortality in the smaller diameter trees is acceptable. Mortality of larger diameter trees would be minimized. Burning to reduce surface fuels within riparian habitat conservation areas (RHCAs) would be coordinated with a district biologist. When lighting within RHCAs, lighting patterns can be utilized that would best meet the surface fuel reduction with limited tree mortality and soil exposure. Soil effects from prescribed burning would be minor. Burning would take place so as to avoid decreasing ground cover below Malheur Forest Plan standards.

In 40 years following the proposed treatments, approximately 36 percent more area would be classified as having a light fuel load compared to no action (Table 57). Surface fuel conditions would further improve if follow up maintenance burning were implemented at least one more time in the next 20 years. The fuel load percentages in Table 57 do not take into account maintenance burning. Surface fuels would become dominated with grasses (fuel model 2) in treated stands. The rate at which a fire moves through these stands would be higher than stands with a greater component of larger woody fuels and denser tree stocking. Wind would be less restricted and fine fuels, such as cured grasses, burn more readily. While increased surface-fire intensity (flame length) under extreme fire-weather conditions is not desirable, the combination of modified surface, ladder, and canopy fuels still suggests improved firefighting capability even under difficult weather circumstances, and also reduced fire severity (resource affects). These expected outcomes are the result of decreased crown-fire potential, lower overall fire intensity, and less damage to soils.

Grazing would continue to affect fine fuels. This can affect the implementation of prescribed fire and meeting objectives if it removes the fuel (grasses) needed to carry fire. Ongoing grazing in the project planning area can also effect fire intensity and rate of spread as flame lengths would be decreased in areas where grazing has reduced the grass loading. Grazing management and fuels management would be coordinated to best meet the objectives of both.

**Table 57. Fuel load in percentage of project planning area—alternative 2 compared to no action**

| Fuel load | No action – 2055 | Alternative 2 - 2055 | Percentage change |
|---|---|---|---|
| 0-8 tons/acre | 24% | 60% | 36% |
| 8-15 tons/acre | 59% | 36% | -23% |
| 15+ tons/acre | 17% | 4% | -13% |

### *Ladder and Crown Fuels*

Mechanical thinning can be effective in reducing vertical fuel continuity that contributes to the initiation of crown fires, especially when thinning reduces the number of smaller trees. The net effect of removing ladder fuels is that surface fires burning through treated stands are less likely to ignite the overstory canopy fuels (Graham et al. 2004). Thinning is potentially effective at reducing the probability of crown-fire spread, and is precise in that specific trees are targeted and removed from the fuelbed.

Commercial and non-commercial cutting would be accomplished by thinning from below; smaller diameter trees would be cut and larger trees retained. This would reduce canopy fuels, ladder fuels, and continuity of the tree crowns.

There is a concern that removal of canopy level trees can increase fire risk. As Peterson (2004) points out, in some cases, removal of trees from the canopy and understory could increase surface wind movement and facilitate the drying of live and dead fuel, although effective removal should mitigate these factors by reducing the fuel load and potential for fire spread. Agee and Skinner (2005) also state that sufficient surface fuel treatments after thinning provides an overall reduction in expected fire behavior and fire severity that usually outweighs the changes in wind speed and fuel moisture. The overall reduction in surface, ladder, and crown fuels, in addition to reducing fuel continuity, reduces crown fire potential and improves firefighter ability to control a wildfire. Commercial and non-commercial treatments in overstocked stands reduces the ladder fuels, increases the average distance between the ground and the crown of the trees, increases the distance between the crowns of the trees, and decreases the continuity of the overstory.

Other benefits of these treatments include increased growth and improved vigor on residual trees, decreased stand density, and increased proportion of fire tolerant species—restoring conditions more resilient to wildfire. Cram et al. (2006) observed that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity. Specifically, as density and basal area decreased and mean tree diameter increased, fire severity decreased. See the Level of and Effects of Silviculture Treatments section for additional effects on composition and density and structural stages.

Canopy base height, canopy bulk density, and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire. The average crown-base height across the project planning area in 2055 increases from 14 feet with the no action alternative, to 26 feet with the treatments proposed in alternative 2. This higher canopy base height reduces the potential for tree torching. The average canopy-bulk density of the project planning area would be 0.06 kilograms per cubic meter (kg/m3), a 0.03 kg/m3 decrease from the no action alternative. Stands with this canopy-bulk density would be less likely to burn with an active crown fire.

Reducing the fuel loadings, fuel continuity, and the availability of ladder fuels keeps fire confined as a surface fire and reduces the occurrence of firebrands, which increases the ability to control fires. In the wildland urban interface (WUI), reducing the threat of ignition from firebrands requires reducing fuels both near and at some distance from the structures. Proposed treatments reduce the likelihood of firebrands being lofted onto private land and structures. This improves our ability to protect life and property.

**Direct and Indirect Effects – Crown Fire Potential**

Following treatments outlined in alternative 2, approximately 12 percent of the project planning area would have potential for active/conditional crown fire (Table 58). The proposed action decreased the amount of area with a high to extreme potential for active/conditional crown fire by 14 percent compared to no action. Within the 12 percent of area with active/conditional crown fire potential only 1 percent is modeled as active crown fire. The other 11 percent has been modeled as conditional crown fire. Conditional crown fire is a somewhat hypothetical situation. In conditional crown fire stands, the crown bulk density is such that fire could be carried through the crowns; however, these stands lack the surface and ladder fuels required to lift a surface fire into the tree canopy. In theory, an active crown fire could run into a conditional crown stand and continue to burn through the canopy. After proposed treatments, only 1 percent of the project planning area is at risk for active crown fire. Essentially, after the proposed treatments, models indicate very little risk of any type of sustained crown fire being initiated. These factors would contribute to successful fire suppression, protection of life, and protection of property under most fire scenarios.

Maintenance burning, whether prescribed or natural ignition, is needed in the future to limit regeneration and maintain light surface fuel loads. Without maintenance burning, future conditions would begin moving back toward the existing condition. Modeling for this project applied prescribed burning once and does not include future maintenance burning over the next 40 years.

By implementing a maintenance burning program, the active/conditional crown fire potential would remain similar to that of alternative 2. Surface fuels would not accumulate and natural regeneration would be controlled to some degree.

**Table 58. Fire type in percentage of project planning area—alternative 2 compared to no action**

| Fire type | Existing condition | No action - 2055 | Percentage change |
|---|---|---|---|
| Active Crown | 15% | 1% | -14% |
| Conditional Crown | 11% | 11% | 0% |
| Passive Crown | 20% | 5% | -15% |
| Surface | 54% | 83% | 29% |

The stands proposed for treatment, the stands currently with a low crown fire potential, and the stands that are non-forested and non-vegetated all contribute to breaking up fuel continuity on the landscape. When all of these stands are considered, the pattern on the landscape would modify fire behavior and reduce fire growth, allowing for protection of life and property.

### Direct and Indirect Effects – Other Project Activities

***Road Activities***

Planned road activities would have little effect on fire suppression efforts or fuel loading. The majority of the roads in the project planning area would remain open; however, a few roads would be closed with a gate to continue to allow access for fire suppression activities. The roads planned for decommissioning would not have a major affect for fire suppression access. Roads proposed for decommissioning were evaluated and determined to be not needed for suppression activities.

***Recreation Opportunity Improvements***

New trail construction, trailhead development, interpretive signs, and dock improvements around Magone Lake would not affect fuel loading. However, increased opportunities for recreation in the project planning area may have an indirect effect as additional recreationalist could lead to more human caused fires.

***Magone Lake Restoration Activities***

Using existing downed material and material created from non-commercial and commercial treatments to complete Magone Lake restoration activities would have beneficial effects on fuel loading in the Magone planning area. Placing this material in the lake rather than piling and burning it would also create a slight reduction in smoke emissions related to prescribed fire activities.

### Direct and Indirect Effects – Air Quality

Burning would follow the guidance provided by the Oregon Smoke Management Plan. Emissions from a wildfire are generally 3 to 5 times more than from prescribed burning. Emissions from pile burning would occur at a different time of year than the underburning. There would be short-term effects to communities and residences downwind and in drainages adjacent to prescribed fire. There would also be short-term effects along highway 395 north, county roads 18 and 32, and local forest roads in the project planning area. All prescribed burning would comply with applicable federal, state, and local air quality regulations.

Communities located in the John Day Valley could be affected by smoke from prescribed burning. At a distance of 25 miles to the west, the community of Dayville is the furthest from the project planning area within the John Day Valley. Other communities in the John Day Valley that could be affected are John Day, Canyon City, Prairie City, and Mt. Vernon, all within 10 miles or less of the project planning area. The communities of Fox, Long Creek, Austin, and Bates, at distances of 8, 10, 15, and 15 miles respectively are located in higher elevation basins and could be affected by prescribed fire smoke, as it tends to settle in these areas during the overnight period. The communities of Unity, Kimberly, Monument, Sumpter, and Hamilton are approximately 30 miles from the planning area and could be affected by prescribed fire smoke because of transport winds, but the effect should be minimal as smoke becomes diluted over time and space.

Past experience of prescribed burning in this area has shown that diurnal winds, down slope and down valley during the night, settle smoke in low areas and valley bottoms. With daytime heating air is forced back up slope and up valley allowing smoke to lift out of an area.

Prescribed burning would likely affect highway visibility and potentially affect driver safety. Signing would occur on highways, county roads, and forest roads as needed to mitigate the hazards associated with operating a motor vehicle during times of poor visibility. If driving conditions warrant, Oregon Department of Transportation and/or Grant County Road Department would be contacted to flag traffic or use pilot cars.

Smoke sensitive areas, including John Day (approximately 6 air miles south of the project planning area), Baker City (approximately 50 air miles to the northeast of the project planning area), and Burns (approximately 60 air miles south of the project planning area), may be affected by prescribed burning because of transport winds. However, affects are expected to be minimal because of smoke dilution over time and space. Weather forecasts would be obtained prior to burning to ensure these smoke sensitive areas would not be affected by prescribed fire smoke. Additionally, the Strawberry Mountain Wilderness should not be directly affected with prescribed fire smoke during the visibility protection periods of July 1 to September 1.

### *Cumulative Effects*

Past, present, and reasonably foreseeable future activities have been considered for their cumulative effects on fire and fuels. The areas considered for cumulative effects are the East Fork Beech Creek and Grub Creek subwatersheds. The period considered for cumulative effects begins approximately 100 years prior to the initial operations and continues for 40 years. This period includes potentially 5 fire cycles prior to and after initial operations if the area were in its natural fire regime. The following discussion focuses on those past, ongoing, and foreseeable activities that may contribute effects to fire or fuels.

Past actions including fire suppression, timber harvest, and grazing have contributed to the current conditions of fuels and the departure from the natural disturbance regime. These actions have resulted in increases in understory vegetation and surface fuels and changes in species composition and vegetative continuity. Past grazing reduced fine fuels at varying levels depending on the intensity of grazing which reduced potential fire spread. Past road construction enabled fire suppression personnel to more easily access fire starts and contributed to successful fire suppression. Past mechanical treatments dating back to the early 1900s helped the project planning area retain its historical fire regime 1.

Approximately 4,300 acres of underburning occurred between 1998 and 1999 as part of the Round Top project. Stands where prescribed fire objectives were being met may still be seeing the benefit of reduced fuel loadings. Coincidently, these stands are nearing the fire-return interval for Hot Dry forest and Warm Dry forest fire regimes.

Cumulatively, this project would have a positive effect on protection of life and property and reduce the potential for severe wildfire across the landscape. Fire suppression would continue as an ongoing activity and the probability of successful suppression would improve with the above mentioned projects. Treatments adjacent to identified safety corridors would establish known anchor points and control lines allowing suppression forces to get ahead of advancing wildfires and complete indirect attack.

Future grazing would continue to affect fine fuels. This can affect the implementation of prescribed fire and meeting objectives if the fuels (grasses) needed to carry fire are removed. Grazing management and fuels management need to coordinate to best meet their objectives. Some people have suggested that continued grazing would also shift the plant communities toward shrubs and trees. Local experience shows increases in tree stocking are not due to grazing but can be attributed to the past combination of timber harvest and fire suppression.

Future prescribed burning and management of natural ignition fires would be necessary to maintain fuels at desirable levels and limit ingrowth. The modeling for this project applied prescribed burning once in the first decade. By implementing a maintenance burning program (applying prescribed fire at regular intervals either planned or unplanned), crown fire potential would remain similar to that described in this alternative. Regeneration would remain at sustainable levels, preventing increases in ladder and surface fuels.

Implementation of the travel management plan, a reasonably foreseeable future action, would not likely reduce the risk for human-caused fires in the project planning area. Past human-caused fires are 22 percent of all cause-documented ignitions. Most of the documented ignitions within the Magone project planning area have been lightning caused. Prior to 2002, cause was not recorded for fire starts within the project planning area. The travel management plan would not impede fire suppression personnel; they could still get to fires utilizing their suppression equipment (engines, crew vehicles, or aviation).

Emissions produced from prescribed burning under alternative 2 would not exceed air quality standards. There is potential for prescribed burning to occur at the same time in nearby project areas. Currently four planning areas are located near the Magone project planning area. The Galena, Balance, 18 Road, and Big Mosquito projects all have completed the NEPA process. Within the next three years, NEPA could be completed for the Camp Lick planning area. Total emissions produced from concurrent projects from 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 the cumulative effects. All burning would be coordinated to reduce cumulative effects and meet all applicable laws and regulations. Therefore, the cumulative effects of multiple prescribed burning projects would not cause air quality to exceed standards.

Future activities authorized under the Malheur National Forest Aquatics Restoration Decision (USDA Forest Service 2014b) include several riparian enhancement projects. The main emphasis on these riparian enhancement projects would be placing large and coarse woody debris in streams. There would be a short-term, 5 to 10 years, adverse effect on fuel loading in the riparian areas where woody debris is placed in the stream and until conifer slash loads are reduced. However, over time the riparian area would begin to function more effectively. A healthy riparian area acts as a natural fuel break to slow and help stop a wildfire. Underburning in the riparian areas would reduce conifer encroachment and stimulate growth of hardwoods.

Juniper, hawthorn, and aspen treatments are also authorized under the Aquatics Restoration Decision. Juniper and hawthorn will be felled and/or pushed over with the root ball intact and placed into the stream. Similar to the addition of large and course woody debris, there would be short-term adverse effects on fuel loading in the riparian area. Aspen treatments would include the removal of conifers up to 21 inches that are shading aspen stands. These conifers could be girdled to create wildlife snags or placed in the stream. Aspen are highly fire-adapted, but aspen-dominated communities do not burn readily (Jones and Debyle 1985).

Aspen foliage is not highly flammable, and the moist herbaceous vegetation that typically forms the understory often would support only light ground fires or no fire at all. Severe fires in aspen are much more likely when there is a dense understory of shrubs or conifers (Jones and Debyle 1985). Like any healthy riparian area, healthy aspen stands can be used as natural barriers to stop the spread of wild fires.

Hardwood planting is another activity authorized under the Aquatics Restoration Decision and could increase live fuel loads by adding to the shrub layer in riparian areas. Once established and after some growth these additional hardwoods will assist in keeping fuel moistures higher, provide more shade, and keep temperatures cooler in the riparian area, thus leading to low-intensity ground fires.

The remaining future activities to be completed under the Aquatics Restoration Decision, such as log weir removal or modification, legacy structure removal, storm proofing roads, spring development, riparian fencing, and beaver habitat restoration will not adversely affect fuel load in the short term. As these activities occur and stream function is restored these healthy riparian areas would become useful fuel breaks to slow down or stop the spread of wildfire.

### 3.5.2.5 Alternative 3

#### *Direct and Indirect Effects*

Alternative 3 proposes about 1,500 more acres of mechanical treatment than alternative 2. In commercial units with additional non-commercial thinning there would be an additional 2,500 acres treated; however, non-commercial thinning in stands designated as replacement old growth would decrease by about 750 acres for a total change in acres treated equal to 1,500 acres. Prescribed fire would be applied to about 28,500 acres, however planned ignitions in burn blocks 6 and 7 would be limited to fall burning (Table 59). Unplanned ignitions may be used like prescribed fire when fuel loading and weather conditions are appropriate.

Proposed treatments would help return the forest to a more resilient and sustainable condition. The overall effect would be a reduction of canopy, ladder, and surface fuels, which would contribute to the success of suppression and protection under most fire scenarios. Stands not receiving treatment would have effects similar to those discussed under the no action alternative. Crown or canopy fuels and ladder fuels would be treated by commercial harvest and non-commercial thinning. Surface fuels would be treated by hand or mechanical piling followed by burning of the piles, removal of slash for utilization (biomass) and/or underburning. Cram et al. (2006) observed that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity.

Prescribed fire burn blocks vary in size from 1,000 to 7,400 acres with boundaries identified along natural fuel breaks, such as existing roads and ridgetops. The size, in acres, of a particular burn block does not represent how much of the landscape would be burned or blackened. Within each identified burn block there would be a number of unburned acres. Examples include open scabby areas, wet riparian areas, and north facing slopes in general. Additionally, much of the area where prescribed fire would carry is expected to burn in a mosaic pattern for a multitude of reasons. Fuel moisture, shading, grazing, and lack of continuous fuelbeds can lead to the mosaic burn pattern often created during prescribed fire operations (see Figure 30). Another factor limiting actual burned acres is design criteria limiting where active ignitions can occur within a particular burn block.

Depending on weather, fuel characteristics, and design criteria (see Appendix C – Project Design Criteria), the number of acres actually burned could vary from 50 to 80 percent of the proposed burn block size.

**Table 59. Magone Project burn blocks alternative 3**

| Burn block | Acres | Planned ignitions |
|---|---|---|
| 1 | 1,400 | Winter, spring, summer, or fall |
| 2 | 7,400 | Winter, spring, summer, or fall |
| 3 | 2,700 | Winter, spring, summer, or fall |
| 4 | 1,000 | Winter, spring, summer, or fall |
| 5 | 3,500 | Winter, spring, summer, or fall |
| 6 | 6,400 | Fall only |
| 7 | 4,900 | Fall only |
| 8 | 1,200 | Winter, spring, summer, or fall |
| **Total** | **28,500** | ***unplanned ignitions can be used any season** |

The beneficial effects of prescribed fire and mechanical treatment would be similar to those discussed under alternative 2. There would be a net increase of 1,500 acres of mechanical treatment in alternative 3 compared to alternative 2. Prescribed burning acres remain the same as alternative 2 at 28,500 acres. The 1,500 acres of additional mechanical treatments combined with prescribed burning would equate to an increase in beneficial effects that will be discussed below. Stands that are not treated would have effects similar to the effects discussed in the no action alternative. Untreated stands would have higher stress induced mortality rates and likely be more affected by wildfire should one occur.

### Direct and Indirect Effects – Fire Hazard

An overall effect of alternative 3 would be a greater reduction of canopy fuels, ladder fuels, and surface fuels, than alternative 2, which would contribute to successful fire suppression and protection of life and property under most fire scenarios. Mechanical fuel treatments that reduce ladder and canopy fuels would have a direct effect on canopy base height and crown bulk density. The continuity of the fuels within the project planning area would be even more discontinuous than alternative 2.

### Direct and Indirect Effects – Fire Regime

Alternative 3 treatments would change vegetation characteristics including stand density, species composition, and structural stage. Treatments would also change fuel composition and potential fire severity, components relating to change from reference conditions. With the additional acres being treated the beneficial effects in vegetation characteristics and fuel loadings would be greater than alternative 2.

Treatments identified in alternative 3 would result in more acres moving towards conditions that are more resilient to natural disturbance processes, including wildfire, than alternative 2. The increased tree growth from thinning would cause the development of old forest structural stages to accelerate, allowing the thinned stands to grow into the large size classes sooner. As structure approaches the historical range of variability, and with continued maintenance burning to sustain low fuel levels, forest structure, composition, and density would move toward more resistant and resilient vegetative conditions given the historical fire regime.

**Direct and Indirect Effects – Fuel Loading**

The additional acres of mechanical treatment proposed in alternative 3 would result in an even greater reduction in fuel loadings than alternative 2. Percentage of the planning area with light fuel loads increases by 8 percent while areas with moderate and heavy fuel loads decrease compared to alternative 2 (Table 57).

**Direct and Indirect Effects – Crown Fire Potential**

The additional acres of mechanical treatment proposed in alternative 3 would result in a slightly greater reduction in crown fire potential compared to alternative 2. Under both alternatives active crown fire potential is 1 percent, but under alternative 3 conditional crown fire areas decrease by 2 percent compared to alternative 2 (Table 58).

**Direct and Indirect Effects – Other Project Activities**

Effects from road activities, recreation opportunity improvements, and Magone Lake restoration activities would be the same as those described under alternative 2 above.

**Direct and Indirect Effects – Air Quality**

The additional mechanical treatments proposed in alternative 3 would result in more machine and handpiles than alternative 2. This would have the potential to produce more smoke emissions from pile burning activities than alternative 2. All smoke management practices would be followed as described in alternative 2.

### *Cumulative Effects*

Cumulatively, alternative 3 would have a slightly more beneficial effect on protection of life and property and even further reduce the potential for severe wildfire across the landscape compared to alternative 2. Fire suppression would continue as an ongoing activity and the probability of successful suppression would improve slightly more with the treatments proposed in alternative 3. Treatments adjacent to identified safety corridors would establish known anchor points and control lines allowing suppression forces to get ahead of advancing wildfires and complete indirect attack.

Emissions produced from prescribed burning under alternative 3 would not exceed air quality standards. There is potential for prescribed burning to occur at the same time in nearby project areas. With an additional 1,500 acres of mechanical treatment proposed in alternative 3 there is potential for an increase in emissions during machine and handpiling activities compared to alternative 2. Currently four planning areas are located near the Magone project planning area. The Galena, Balance, 18 Road, and Big Mosquito projects all have completed the NEPA process. Within the next 3 years, NEPA could be completed for the Camp Lick planning area. Total emissions produced from concurrent projects from 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 the cumulative effects. All burning would be coordinated to reduce cumulative effects and meet all applicable laws and regulations. Therefore, the cumulative effects of multiple prescribed burning projects would not cause air quality to exceed standards.

### 3.5.2.6 Alternative 4

*Direct and Indirect Effects*

Alternative 4 proposes about 6,300 acres fewer of mechanical treatment than alternative 2. In commercial units with additional non-commercial thinning there would be about 1,100 acres fewer treated. Non-commercial thinning decreases by 5,200 acres in the planning area. The net total mechanical acres treated are approximately 6,300 acres. Planned ignitions would occur on about 17,200 acres (Table 60). Stands in burn blocks 6 and 7, about 11,300 acres, would be managed with unplanned ignitions as timing, fuel loading, and weather allow. Burn blocks 6 and 7 make up the majority of the Nipple Butte IRA except for a portion of the northeast corner. While modeling this alternative, prescribed fire was used once in the first 10 years in all burn blocks including 6 and 7, with the idea being that unplanned ignitions would be used when conditions mimic those used in prescribed fire. In all burn blocks unplanned ignitions may be used like prescribed fire when timing, fuel loading, and weather conditions are appropriate.

Proposed treatments would help return the forest to a more resilient and sustainable condition. The overall effect would be a reduction of canopy, ladder, and surface fuels, which would contribute to the success of suppression and protection under most fire scenarios. Stands not receiving treatment would have effects similar to those discussed under the no action alternative. Crown or canopy fuels and ladder fuels would be treated by commercial harvest and non-commercial thinning. Surface fuels would be treated by hand or mechanical piling followed by burning of the piles, removal of slash for utilization (biomass) and/or underburning. Cram et al. (2006) observed that mechanical treatment followed by prescribed fire (including pile burning) had the greatest influence toward mitigating fire severity.

Prescribed fire burn blocks vary in size from 1,000 to 7,400 acres with boundaries identified along natural fuel breaks, such as existing roads and ridgetops. The size, in acres, of a particular burn block does not represent how much of the landscape would be burned or blackened. Within each identified burn block there would be a number of unburned acres. Examples include open scabby areas, wet riparian areas, and north facing slopes in general. Additionally, much of the area where prescribed fire would carry is expected to burn in a mosaic pattern for a multitude of reasons. Fuel moisture, shading, grazing, and lack of continuous fuelbeds can lead to the mosaic burn pattern often created during prescribed fire operations (see Figure 30). Another factor limiting actual burned acres is design criteria limiting where active ignitions can occur within a particular burn block. Depending on weather, fuel characteristics, and design criteria (see Appendix C – Project Design Criteria), the number of acres actually burned could vary from 50 to 80 percent of the proposed burn block size.

**Table 60. Magone Project burn blocks alternative 4**

| Burn block | Acres | Planned ignitions |
|---|---|---|
| 1 | 1,400 | Winter, spring, summer, or fall |
| 2 | 7,400 | Winter, spring, summer, or fall |
| 3 | 2,700 | Winter, spring, summer, or fall |
| 4 | 1,000 | Winter, spring, summer, or fall |
| 5 | 3,500 | Winter, spring, summer, or fall |
| 8 | 1,200 | Winter, spring, summer, or fall |
| **Total** | **17,300** | ***unplanned ignitions can be used any season** |

The beneficial effects of prescribed fire and mechanical treatment would be similar to those discussed under alternative 2 in units being treated in this alternative. There is a net decrease of 6,300 acres of mechanical treatment in alternative 4 compared to alternative 2. Prescribed burning acres treated with planned ignitions decrease by 11,300 acres compared to alternative 2. Much of the decrease in mechanical and prescribed burning treatments occurs in the Nipple Butte IRA. The 6,300 acres fewer mechanical treatments combined with 11,300 acres fewer of planned prescribed burning would equate to a decrease in beneficial effects that will be discussed below compared to alternative 2. Stands that are not treated would have effects similar to the effects discussed in the no action alternative. Untreated stands would have higher stress induced mortality rates and likely be more affected by wildfire should one occur.

**Direct and Indirect Effects – Fire Hazard**

An overall effect of alternative 4 would be less reduction of canopy fuels, ladder fuels, and surface fuels, than alternative 2, which would contribute to more difficult fire suppression and protection of life and property under most fire scenarios. The decrease in mechanical treatments that reduce ladder and canopy fuels would have a direct effect on canopy base height and crown bulk density. There would be less beneficial change in canopy base height and crown bulk density, which equates to less reduction in fire hazard and severity than alternative 2. The continuity of fuels within the project planning area would be more continuous than alternative 2 increasing the potential for a fire to resist control.

**Direct and Indirect Effects – Fire Regime**

Alternative 4 treatments would have less effect on vegetation characteristics including stand density, species composition, and structural stage. Treatments would also have less effect on fuel composition and potential fire severity, components relating to change from reference conditions. With the reduction in acres being treated the beneficial effects on vegetation characteristics and fuel loadings would be less than alternative 2.

Treatments identified in alternative 4 would result in less acres moving towards conditions that are more resilient to natural disturbance processes, including wildfire, than alternative 2. The reduction in treated stands equates to more acres remaining overstocked and susceptible to the effects of uncharacteristic wildfire that would not have occurred historically in fire regime 1 plant association groups.

Within the additional untreated acres in alternative 4 tree densities would continue to increase and species would continue the shift to higher proportions of shade tolerant, fire susceptible fir. Stand conditions would increase susceptibility to insect and disease effects, reaching levels that are highly departed from the natural fire regime. Forested stands not being treated under alternative 4 in the project planning area would continue to depart further from the natural fire regime compared to alternative 2.

**Direct and Indirect Effects – Fuel Loading**

The reduction in acres of mechanical treatment proposed in alternative 4 would result in less reduction of fuel loading than alternative 2 (Table 57). The portion of the planning area with light fuel loads would be 40 percent. Moderate fuel loads at 48 percent and heavy fuel loads at 12 percent comprise the remaining acres of the planning area. The decrease in planned ignitions would limit the ability to perform maintenance burning, an essential tool for decreasing and/or maintaining surface fuel loading.

**Direct and Indirect Effects – Crown Fire Potential**

The result of treating fewer acres in alternative 4 would be an increase in potential active/conditional crown fire in the planning area compared to alternative 2 (Table 58). Active and conditional crown fire would comprise 21 percent of the planning area. That is a 9 percent increase compared to alternative 2. These predictions are similar to the no action alternative, which estimates active/conditional crown fire at 26 percent. Even with fewer acres treated 64 percent of the planning area is still expected to experience surface fire should an ignition occur. These predictions also assume that burn blocks 6 and 7 would have an unplanned ignition managed under conditions similar to prescribed fire conditions in the next 10 to 15 years. If timing, weather, and fuel loading do not allow for managing an unplanned ignition in burn blocks 6 and 7 then it could be expected that crown potential would be slightly higher than what has been modeled.

**Direct and Indirect Effects – Other Project Activities**

Effects from road activities, recreation opportunity improvements, and Magone Lake restoration activities would be the same as those described under alternative 2 above.

**Direct and Indirect Effects – Air Quality**

Treating fewer acres in alternative 4 would have the least amount of immediate effect on air quality from prescribed burning. There would be fewer emissions from planned ignitions and pile burning. In untreated stands biomass would continue to accumulate and remain available for consumption by wildfires, increasing the potential for large amounts of smoke during the summer months when diurnal inversions can concentrate smoke at low elevations. Wildfires tend to occur at the driest time of the year; therefore, fuels are more completely consumed and typically produce three to five times more emissions than early- or late-season prescribed fires. These smoke concentrations can have high particulate levels that may cause health problems or violate summertime Class I air quality visibility standards for wilderness areas. The communities of Long Creek, Fox, Prairie City, Mt. Vernon, Austin, Bates, Unity, Kimberly, Monument, Sumpter, Hamilton, Dayville, and John Day could be affected by smoke from a wildfire in this area.

### *Cumulative Effects*

Cumulatively, alternative 4 would have fewer beneficial effects on protection of life and property and would do less to reduce the potential for severe wildfire across the landscape compared to alternative 2. Fire suppression would continue as an ongoing activity; however probability of successful suppression would diminish in areas with fewer mechanical treatments as fuels continued to accumulate. Fuel loadings and crown fire potential would also remain higher adjacent to identified safety corridors thus limiting potential escape routes in the planning area and reducing established control lines.

Emissions produced from prescribed burning under alternative 4 would not exceed air quality standards. There is potential for prescribed burning to occur at the same time in nearby project areas. With a reduction of 6,300 acres of mechanical treatment proposed in alternative 4 there would be less immediate effect on air quality from prescribed burning of pile material. The long term effect of fewer mechanical treatments would be potential for increased emissions from wildfire. Currently four planning areas are located near the Magone project planning area. The Galena, Balance, 18 Road, and Big Mosquito projects all have completed the NEPA process. Within the next 3 years, NEPA could be completed for the Camp Lick planning area.

Total emissions produced from concurrent projects from 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 the cumulative effects. All burning would be coordinated to reduce cumulative effects and meet all applicable laws and regulations. Therefore, the cumulative effects of multiple prescribed burning projects would not cause air quality to exceed standards.

With no mechanical treatments in the Nipple Butte IRA and the limited options for prescribed fire, suppression would become more difficult as fuel and vegetation characteristics departed further from historical ranges. This would make protecting life, resources and property within and adjacent to the Nipple Butte IRA more difficult over time.

Cumulative effects for grazing, travel management, and activities authorized under the Malheur National Forest Aquatics Restoration Decision (USDA Forest Service 2014b) would be similar to those discussed in alternative 2.

#### 3.5.2.7 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The no action alternative would not meet the Malheur Forest Plan direction to:

- Initiate initial suppression action that provides for the most reasonable probability of minimizing fire suppression costs and resource damage, consistent with probable fire behavior, resource impacts, safety, and smoke management considerations (Forest Goal 48, chapter IV–pg. 4).
- Identify, develop and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (Forest Goal 49, chapter IV–pg. 4).

The no action alternative would also fail to meet the objectives of the Grant County Community Fire Protection Plan (2005).

All action alternatives (alternatives 2, 3, and 4) are, at some scale, consistent with the objectives of the Grant County Community Fire Protection Plan because project activities would reduce hazardous fuel to protect lives and property. All action alternatives would meet the following Malheur Forest Plan direction:

- Forest Goal 49: Identify, develop and maintain fuel profiles that contribute to the most cost-efficient fire protection program consistent with management direction (Malheur Forest Plan, chapter IV–pg. 4).
- Forest Objective: Ground fuels are to be reduced significantly. Total smoke production on an annual basis will be reduced substantially as a result of fewer and lower intensity wildfires (Malheur Forest Plan, chapter IV–pg. 10).
- Forest-wide Standard 180: Utilize prescribed fire to meet land management objectives (Malheur Forest Plan, chapter IV–pg. 45).
- Forest-wide Standard 181: Mange residue profiles at a level that will minimize the potential of high intensity catastrophic wildfires (Malheur Forest Plan, chapter IV–pg. 45).

The Magone Project was designed under the rules of the Collaborative Forest Landscape Restoration Program (CFLRP) because it is within the expanded CFLRP boundary on the Malheur National Forest.

# 3.6 Analysis Issue – Soils

## 3.6.1 Existing Condition

### 3.6.1.1 Soil Types

Soil types vary in their response to logging, based on such things as the presence of a volcanic ash cap, geology, soil depth, and rockiness. The best source of information about the location of soil types is the Terrestrial Ecological Unit Inventory (TEUI). The TEUI is available as a digital map layer and associated database. Maps of ash cap, "scab soil," slope, and landslides can be found in the project record.

The presence of a volcanic ash cap causes important differences in soils. Most soils in the Blue Mountains are influenced by ash. However, soils with a distinct cap of ash differ from soils where ash has been partially eroded away or mixed with the residual soil (hereafter called "mixed ash") because typically ash cap soils have more total ash than mixed ash soils and are more uniform. Ash cap soils typically supply more water to plants because 1) ash holds relatively large amount of water, 2) ash cap soils are typically deeper, and 3) ash caps have fewer coarse fragments in the top soil than mixed ash soils. Thus ash cap soils are typically more productive than mixed ash. Ash cap soils typically support mixed conifers, including true fir. Mixed ash soil typically supports ponderosa pine and often Douglas-fir. In addition, ash cap soil has a high porosity and little clay, so it has a high infiltration rate. The high infiltration rate of ash cap soils tends to reduce runoff, and thus reduce erosion. However, if runoff does occur on ash cap soils, the soil particles are easily detached and eroded. An ash cap soil is more easily displaced than mixed ash soil. Ash cap soils often tend to occur on north and east facing slopes, although several north facing slopes in Nipple Butte Inventoried Roadless Area (IRA), and also some within a mile east of the IRA, have little ash cap.

Forested soils have abundant ground cover, so the potential for erosion exists only where ground cover has been removed. The erosion hazard of forest soils is low on slopes less than 30 percent and moderate on slopes more than 30 percent.

Rock types in this planning area cause some variation in soils. About 70 percent of the project planning area is underlain by breccia and basalt of the Clarno Formation and about 25 percent is underlain by Columbia River Basalts. Columbia River Basalts lie along the western and southern edges of the project planning area.

The Clarno formation includes lava flows of andesite and basalt, tuff, and volcanic mudflow breccias and conglomerates. Breccias and tuffs weather to clays. When wet, clay cannot support much weight, so slumps and landslides are common in Clarno terrain. In addition, clayey soils have low infiltration rates. Basalt and andesite tend to weather to loam and clay loam, so they are not particularly prone to landslides or low infiltration rates.

Unconsolidated landslide deposits can be a source of sediment; however, abundant vegetation on landslides and overlying volcanic ash help control soil erosion. Landslides shown on the map in the project record comprise 3 percent of the project planning area, with the majority located toward the western edge of the project planning area. Many of the landslides probably started during the ice ages, when there was abundant water and less vegetation. The landslides continue to move downhill slowly with shallow creep and slumps, often only several yards across. If roads are built on landslides, care is needed to avoid causing more movement.

Sensitive soil types include soils that are un-forested (including juniper woodlands), shallow, and rocky, that support low amounts of ground cover. These are commonly known as "scab soils." Scab soils cannot absorb much water, and they produce overland flow. These soils tend to be erodible and generally are not found in timber harvest units, but can be adjacent to units. Although scab soils are generally more concentrated within the IRA, they are scattered throughout most of the project planning area.

Slopes steeper than 35 percent occur in the north half of the IRA and adjacent areas, along Tinker Creek and East Fork Beech Creek below Tinker Creek, and scattered elsewhere.

Elevations range from about 3,600 feet near the mouth of East Fork Beech Creek, to 6,200 feet on the ridge from Lake Butte west. Precipitation ranges from about 16 to 24 inches per year, depending on elevation.

### 3.6.1.2 Existing Detrimental Impacts

Existing detrimental soil conditions were estimated in two phases. First, the project soil scientist judged the likelihood of heavy detrimental impacts by inspecting soil types from the Terrestrial Ecological Unit Inventory and by inspecting satellite photos for signs of past impacts (for stands larger than 23 acres). In total, 62 percent of the proposed ground-based harvest acres were inspected in the first phase. Second, "soil assessments" of existing detrimental conditions were conducted. For soil assessments, technicians visited the stands that appeared likely to be most heavily impacted and collected semi-quantitative information about impacts from past and ongoing activities, and inspected to see if special project design criteria are needed to protect soil. Assessments were done in summer 2014. The assessments revealed all impacts from past and ongoing activities including logging, roads, fuel treatments, livestock grazing, firewood cutting, mining, and off-road vehicles (see Table 13).

Existing detrimental conditions range from zero to 13 percent. Table 61 shows existing detrimental conditions on all units in which existing detrimental conditions exceed 5 percent; unlisted units have less than 6 percent detrimental conditions.

**Table 61. Existing condition for all silvicultural treatment units with 6 percent or more existing detrimental impacts**

| Unit | Existing detrimental impacts (percentage of unit) | Detrimental conditions after logging, percentage of unit | Special project design criteria* |
|---|---|---|---|
| 167 | 8% | 17% | - |
| 179 | 12% | 16% | s |
| 181 | 6% | 15% | - |
| 183 | 6% | 15% | - |
| 219 | 7% | 16% | - |
| 225 | 6% | 15% | - |
| 227 | 7% | 16% | - |
| 230 | 11% | 17% | s |
| 239 | 8% | 17% | s |
| 241 | 13% | 17% | s |
| 253 | 6% | 15% | - |
| 255 | 6% | 15% | - |
| 303 | 7% | 17% | - |

| Unit | Existing detrimental impacts (percentage of unit) | Detrimental conditions after logging, percentage of unit | Special project design criteria* |
|---|---|---|---|
| 601 | 6% | 17% | - |
| 603 | 11% | 17% | s |
| 615 | 10% | 17% | s |
| 617 | 8% | 17% | s |
| 631 | 7% | 15% | - |
| 633 | 7% | 17% | - |
| 643 | 9% | 16% | - |
| 649 | 7% | 15% | - |
| 653 | 9% | 17% | s |
| 655 | 9% | 17% | - |

* s = Special project design criteria required (for complete descriptions see Appendix C – Project Design Criteria, Table C-1); - = None.

#### 3.6.1.3 Organic Matter and Nutrients

Decades of fire suppression have resulted in heavier forest floors (litter and duff) on most soils than would occur under the natural frequent fire regime. Fire usually decreases the amount of nutrients on the land (though easily available nutrients often increase for 1 to 5 years). Underburning has not occurred in the area for many decades, so loss of nutrients during fires has not occurred. Nutrients have accumulated as inputs accumulate from the atmosphere and from mineral weathering. Thus, more nutrients occur in the forest floor and in plants now than in the 1800s. This increase in nutrients has been partially offset by nutrient removals during past logging and fuel treatments.

### 3.6.2 Environmental Consequences

#### 3.6.2.1 Indicators for Assessing Effects

The measurement indicators detailed in Table 62, and described above, are used for assessing the effects to soils in the Magone project planning area.

**Table 62. Resource Indicators and measures for assessing effects to soils**

| Resource indicator | Measures |
|---|---|
| Detrimental soil conditions | Number of units that violate Malheur Forest Plan standards |
| Organic matter and nutrients | Difference from levels of organic matter and nutrients before Euro-American settlement |

#### 3.6.2.2 Methodology

Methodology for assessing the existing detrimental soil conditions is described in the Existing Condition section above.

The project soils specialist has formed professional judgments on probable effects. Professional judgments are based on monitoring, personal observation (including observation in similar areas, and in this area), scientific literature, and professional contacts. These professional judgments are summarized in the “Quantitative logging effects on detrimental soil conditions” report contained in the project record.

Briefly, effects are calculated for each unit based on site specific existing detrimental condition, volume to be removed, biomass removal, the amount of draws, the amount of slopes steeper than 35 percent, the presence of a volcanic ash cap and coarse fragments, the amount of uphill skidding, and the presence of short skidtrails. To find total cumulative effects, the individual impacts of skidder, landings, biomass harvest, and grapple piling are added together to find the direct and indirect effects, which are added to effects from past and ongoing activities to find the cumulative effects. However, quantitative effects cannot be precisely predicted. Soil science is not advanced enough to make precise predictions. In addition, effects of management depend on unknowns, such as weather, variation in soil, details of implementation, and whether a wildfire would occur.

#### *Spatial and Temporal Context for Effects Analysis*

Spatial boundaries for soil effects are proposed unit boundaries. Unless otherwise stated, effects are described for the time period immediately after the proposed actions occur.

#### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

Of the activities listed in Table 13, logging, roads, fuel treatments, livestock grazing, firewood cutting, mining, and OHVs are the activities relevant to cumulative effects analysis for soil. Their effects are described in the Existing Condition section above.

### 3.6.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

Taking no action would cause no direct or indirect detrimental soil impacts. Root action, animals that burrow in the soil, and freezing water would gradually continue to loosen compacted and puddled soil over the course of decades. Forest floor organic matter and nutrients would continue to accumulate, as described in the Existing Condition section.

#### *Cumulative Effects*

Because there are no direct or indirect effects, no cumulative effects would occur. However, a consequence of alternative 1 is the hazard of severe wildfire would continue to increase (see Fire, Fuels, and Air Quality section), resulting in increased hazard of erosion and loss of nutrients.

### 3.6.2.4 Alternatives 2, 3, and 4

#### *Direct and Indirect Effects*

**Silviculture Treatments**

**Tractor Logging** – Skidding on steep slopes often causes displacement. Water bar construction also often causes displacement. Skidding also bares soil, decreases infiltration, and channels overland flow, and thus can accelerate erosion. This acceleration occurs especially on steep slopes. Thus, logging on steeper slopes is expected to cause more impact than on sites with flatter slopes. Uphill skidding is expected to have more impacts than downhill due to the additional power and slipping of wheels with uphill skidding.

However, the experience of the project soil specialist indicates damage by logging using the design criteria is acceptable because only moderate amounts of displacement occur, and because of the small size of the area affected. Displacement and erosion from steep slope skidding would be limited because slopes steeper than 35 percent occupy a relatively small proportion of most units and because the extensive ground cover in forests absorbs sediment. Design criteria, such as directional felling and winching, would also help limit displacement and erosion. Usually erosion of skid trails decreases through 1 to 3 years, until it stops. Decreased productivity due to severe displacement and erosion can last hundreds of years. Design criteria that effectively control displacement and erosion include a prohibition on skidding on highly erodible soil, a prohibition on skidding on steep slopes (>45 percent downhill, >35 percent uphill), limitations on skidding in draws, and water bar requirements.

Skidding would cause negligible sediment export from the units, despite sediment movement within units as described in the preceding paragraphs. Sediment normally is deposited less than 15 feet down slope from skid trails as the water is slowed by ground cover and percolates into the soil. This is true even on slopes up to 45 percent.

Much of the skid trail area would be compacted and some of the soil tracked only once or twice would be compacted. Skid trail compaction would range from 4 to 7 percent of the acreage in the units, depending on factors described in the “Methodology” section. Compaction usually lasts more than 20 years; some compaction lasts more than 50 years. Table 61 presents expected detrimental conditions for the units with more than 4 percent existing detrimental conditions. If the unit happens to be harvested over deep snow or on deeply frozen soil, increase in compaction would be about 30 percent of the predicted amount because these conditions spread out the weight of the equipment over a larger footprint. Design criteria effective at limiting compaction include designating skidtrail locations, requiring skidtrails to be widely spaced, reusing existing skidtrails where appropriate, prohibiting skidding under wet conditions, allowing only low ground-pressure machinery off skidtrails. The design measures would keep compaction to a practical minimum and indicate the Malheur Forest Plan standards likely would be met in all units. Note the Malheur Forest Plan Standard is 17 percent (20 percent minus 3 percent in roads). In order to reduce impacts to 17 percent, “special design criteria” have been prescribed for units that would have more than 17 percent impacts with only the standard design criteria (Table 61).

Landings are severely impacted by heavy machinery and by pile burning. The design criterion that encourages re-use of appropriately located landings would keep these conditions to a minimum. After logging, about 3 percent of the acreage of the units would be detrimentally impacted in landings.

Some harvest would occur in areas with moister soil, such as aspen stands and other moist upland areas. Moister soils are more susceptible to compaction and puddling. However, the design criteria that 1) bans ruts deeper than 6 inches, and 2) prohibits skidding or forwarding in moist meadows would limit operations on wet soil.

**Forwarder Logging and Biomass Harvest** – Forwarder logging causes less impact than skidder logging because forwarders have lower ground pressure, forwarders tend to travel over slash, and forwarders do not require landings. Forwarder/harvester logging systems increase detrimental conditions about 5 percent over the existing condition.

Effects of biomass harvest after normal logging (logging of trees larger than biomass trees) depend on whether the logging systems for the normal logging and for the biomass harvest are the same. If they are the same (and biomass harvest is done soon enough after the normal logging that skid trails can still be seen), biomass harvest would add about 1 percent more detrimental conditions. If logging systems for the normal logging and for the biomass harvest were not the same, biomass harvest would add about 3 percent more detrimental conditions. The difference between 3 percent and 1 percent is due to the fact that with different logging systems the biomass harvest would make new forwarder/skid trails, whereas with the same logging systems the biomass harvest would use the same forwarder/skid trails.

**Subsoiling or Winter Logging** – Subsoiling or winter logging may be used on units 179, 230, 241, and 603 (see Appendix C – Project Design Criteria, Table C-1). Subsoiling would decrease detrimental conditions by about 50 percent for the skid trails subsoiled.

Subsoiling bares soil, forms channels, makes soil particles more easily detachable, and disrupts roots, thus raising the risk of erosion for a few years. However, subsoiling also increases infiltration, which decreases the risk of erosion. This increased infiltration and the subsoiling design criteria would control sediment production so it would be negligible.

On any unit where winter logging is used, the increase in detrimental impacts would be 30 percent of the increase expected under early summer conditions. When harvesting over deep snow or on deeply frozen soil the weight of the equipment is spread out over a larger “footprint”.

**Grapple Piling and Pile Burning, and Mastication** – A design criterion requires grapple piling and mastication machinery to have a low ground pressure to operate on dry soil, and to operate on skid trails where possible. With this design criterion, the project soils specialist expects grapple piling or mastication would compact about 1 percent of each unit where it is used. Feller bunchers of similar ground pressure operating off skid trails compacted about 1.5 percent of a unit (McNeil 1996). This would be in addition to impacts caused by harvest.

Soil beneath grapple piles would be detrimentally burned, taking many years to recover. However, the project soil specialist has rarely observed detrimentally burned soil that occupied more than 2 percent of a unit.

**Summary of Detrimental Conditions** – As shown by the difference between the “existing condition” and “after logging” columns in Table 61, increases in detrimental conditions would range from 4 to 11 percent, and average 8 percent in commercial thinning units.

The total acreage of detrimental impacts would be highest in alternative 3, which has the most acreage thinned and lowest in alternative 4, which has the least.

**Skyline Logging** – Skyline logging causes much less displacement, erosion, and compaction than tractor logging—detrimentally affecting about 1 to 2 percent of the area. Logs that drag during skyline logging can displace soil and concentrate erosive runoff in furrows. Required cross drains would divert runoff from the furrows, so the amount of erosion would be negligible and soil would be unlikely to leave the unit.

**Non-commercial Thinning** – The effect of biomass harvest in non-commercial thinning without commercial thinning is about a 4 percent increase in detrimental conditions because it is usually done with forwarders, and the forwarders are not as heavily loaded as they are with logs. This amount of impact is not expected to raise cumulative detrimental conditions above 17 percent.

Juniper removal is proposed for some highly erodible "scab soils." Erosion on these soils would be controlled by the design of the treatments (see Chapter 2 Non-Commercial Thinning section and Appendix C, Soil PDCs). These design criteria include leaving 7 to 10 tons per acre of slash distributed in the units, banning heavy equipment except under winter conditions, placing piles so as to minimize damage, and burning piles so that some material would not be consumed.

**Organic Matter and Nutrients** – Logging would remove nutrients and organic matter in logs. For further discussion, see the Prescribed Burning section immediately below.

### Direct and Indirect Effects – Prescribed Burning and Unplanned Ignitions

**Detrimental Conditions** – Pile burning would cause some detrimental soil burning. The extent would be limited by the design criterion that limits piles to no more than 5 percent of any unit. Less than 5 percent of any unit would be detrimentally burned, because well under 100 percent of the area under piles is detrimentally burned. Sometimes it is zero percent.

Soil effects from underburning would be minor. Ground cover would decrease, especially during fall burns. However, burning would be controlled so as to avoid decreasing ground cover below Malheur Forest Plan standards (Forest-wide standard 127), so erosion would not be significant. Ground cover recovery would take 1 to 5 years.

Soil effects from fireline construction would be minor. Erosion would be controlled by a design criterion that requires waterbars, and bans firelines that go down draw bottoms. Firelines impact a negligible area of soil.

**Organic Matter and Nutrients** – Logging would remove nutrients and organic matter in logs, and fuel reduction treatments would remove nutrients and forest floor organic matter during burning and biomass utilization. The removal, especially removal of nitrogen, may decrease site productivity a few percent on some sites. However, on many or most sites, productivity is likely limited by water, not by nutrients or forest floor organic matter. In addition, removal of nutrients would be limited because most nutrients on the site would remain in the soil, in the remaining forest floor, and in remaining trees.

Removing organic matter and nutrients by logging and fuel control would move many sites back toward their fertility status before Euro-Americans arrived because nutrient and organic matter loss in fires was common then. Under the action alternatives, more organic matter and nutrients would be cycled through the mineral soil and less through the forest floor. Before fires were suppressed, little dead wood existed because low severity fires burned it up. Fires possibly left more nutrients on site than piling and burning of slash does. However, these high fire-frequency ecosystems have persisted for thousands of years with low levels of forest floor and dead wood and these ecosystems are adapted to low levels of surface organic matter, so removal of the unnatural organic matter would have a small adverse effect.

### Direct and Indirect Effects – Road Activities

Road maintenance and opening and closing roads would have no effect on detrimental soil conditions.

Temporary road construction would heavily impact soil in the small area of soil in road prisms. During temporary road construction and use, soil may be eroded from the road surface. The sediment would be deposited within 20 feet of the edge of the road. Productivity would be lost from displacement and compaction.

If subsoiling is used during restoration, subsoiling would partially recover past detrimental impacts. On subsoiled temporary road segments, most productivity lost to compaction would be restored; perhaps half the area of the roads would be in a restored condition. Productivity lost to displacement and untreated compaction would recover over the course of several decades. On un-subsoiled temporary road segments, productivity would remain low for a few decades, until natural processes restore productivity.

Road decommissioning would slowly increase productivity on the former road, as processes such as root growth, soil freezing, and soil animal burrowing loosens the soil.

**Direct and Indirect Effects – Recreation Opportunity Improvements and Magone Lake Restoration Activities**

Trail and trailhead development would detrimentally impact a negligible acreage of soil. Standard practices would control erosion.

*Cumulative Effects*

The geographic scale for cumulative effects analysis is each proposed unit. The temporal scale is after operations cease, before natural recovery starts.

Detrimental impacts from the proposed operations (logging, subsoiling, and fuels control) add to impacts of past and ongoing actions. Table 61 “after logging” column shows what the expected condition would be for units in the table. Maximum cumulative detrimental conditions would be 17 percent. Thus, the Malheur Forest Plan standard of 17 percent (20 percent minus 3 percent in roads) would be met in all units.

Livestock grazing, firewood cutting, and mining would continue to impact a negligible amount of soil in harvest units, as recovery from past use balances impacts from future use. The negligible detrimental impacts from cross country travel (OHV use) would decrease even more with implementation of the 2005 Final Rule for Travel Management; Designated Routes and Areas for Motor Vehicle Use (Travel Management Rule). It is unlikely that site-specific invasive plant treatment would detrimentally impact soil because it would not use heavy equipment and herbicides would become inactivated as described in the Malheur National Forest Site-Specific Invasive Plants Treatment EIS. Activities authorized under the Aquatic Restoration Decision are unlikely to cause soil cumulative effects with the Magone Project because they will mostly be in riparian areas or juniper stands, outside thinning units. If there is overlap, the checklist for the Aquatic Restoration Decision would insure compliance with the Malheur Forest Plan.

Removing organic matter and nutrients by logging and fuel control would move many sites back toward their fertility status before Euro-Americans arrived. Site-specific invasive plant treatments may impact organic matter and nutrients on negligibly small areas.

### 3.6.2.5 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan) meets all legal and regulatory requirements for soil conservation. Forest Service Manual R6 Supplement No. 2500.98-1, section 2520.2 says objectives of soil management are “To meet direction in the National Forest Management Act of 1976 and other legal mandates. To manage National Forest System lands ... without permanent impairment of land productivity and to maintain ... soil ... quality.....

Soil quality is maintained when soil compaction, displacement, puddling, burning, erosion, loss of organic matter and altered soil moisture regimes are maintained within defined standards and guidelines." Therefore, if an action maintains detrimental conditions within the standards of the Malheur Forest Plan, legal requirements for soil conservation would be met.

All alternatives would be consistent with Malheur Forest Plan soil protection standards (Forest-Wide Standards 101, page IV-37 and 125-129, page IV-40) because design criteria would keep impacts small enough that cumulative effects from proposed activities comply with the standards. Reasons are explained in the preceding sections of this report.

# 3.7 Analysis Issue – Watershed

## 3.7.1 Existing Condition

The analysis area for the Magone Project is those portions of the Grub Creek and East Fork Beech Creek subwatersheds that lie within the administrative boundary of the Malheur National Forest. The location of the Forest boundary relative to the topography results in the portions of the two subwatersheds that lie within the project planning area appearing to have distinctly different drainage patterns. Hillslopes, draws, and streams in the East Fork Beech Creek subwatershed drain to a single, common point of discharge—the confluence of East Fork Beech Creek with Beech Creek. The Grub Creek subwatershed appears to have multiple drainage points due to the location of the Forest boundary. However, the area within the subwatershed eventually drains to a single, common point of discharge—the confluence of Grub Creek with the John Day River. The drainage patterns are described in more detail under the Hydrography sections below.

Although remnant conditions suggest more wetlands were present, only a few wetlands are mapped in the project planning area based on the National Wetlands Inventory wetland classification codes produced by the U.S. Fish and Wildlife Service (Cowardin et al. 1979).

### 3.7.1.1 Climate and Hydrology

The climate in the project planning area resembles a continental climate with moderate summer temperatures and cold winter temperatures but it differs from a true continental climate by influences related to proximity of the Pacific Ocean and Cascade mountain range. Diurnal variation is wide throughout the year with below freezing temperatures possible in any month. Nighttime longwave radiation, typical of continental climates with infrequent cloud cover, commonly results in summer night temperatures below 45 degrees Fahrenheit. In fall, winter, and spring, night temperatures may fall well below freezing and frequently below zero in winter. Southerly exposures result in summer daytime temperatures that are among the highest in the Blue Mountains. Daytime solar radiation in winter may warm slopes, especially south-facing slopes typical of the project planning area, offsetting nighttime cold temperatures and leading to frequent snowmelt. Some areas are topographically shaded in winter due to rolling mountains to the south and the low sun angle typical of the latitude, resulting in less frequent snowmelt.

Precipitation falls mainly as snow although measurable amounts of precipitation may fall as extended spring/fall or winter rains or with summer wet convection storms. Annual patterns of accumulation and timing of snowfall and other precipitation are highly variable and result in variable patterns of runoff (including seasonal infiltration and overland flow production). The annual variation is influenced substantially by storm systems and other climate characteristics related to large regional factors such as jet stream behavior.

Snowmelt is also controlled by complex interactions between the cold nighttime temperatures, topographic shading or exposure to solar radiation and/or wind, and daytime temperatures. Because normal annual patterns of runoff appear variable and substantially influenced by natural landscape characteristics, variation in jet-stream behavior due to global warming probably results in runoff events that are within the natural range of variability in size and timing. Trends in precipitation and temperature associated with global warming in the next few decades would be likely to reinforce the range of existing patterns, possibly shifting a greater percentage of precipitation to rain instead of snow.

Overland flow is associated with extended spring and fall rains; with winter rains that may or may not cause rain-on-snow events, with summer wet convection storms, and with snowmelt. Rain-on-snow events are typically limited in geographic extent due to the wide range of elevations present. Snowmelt is moderated by the wide diurnal temperature variation, the elevational range, and the variety of aspects in the project area. For instance, much of the snow cover on south-facing slopes may melt, runoff, and re-accumulate several times in a typical winter whereas snow on north-facing slopes tends to accumulate except for loss to sublimation. Microbursts of rain or partially frozen precipitation may occur within wet convection storms.

#### 3.7.1.2 Topography

Topography is steeply to gently hilly except in the Nipple Butte Inventoried Roadless Area which is steep and steeply dissected by draws and stream valleys. Elevations range from about 3,600 to 6,200 feet. The wide range of elevation partially controls the snowmelt regime. Stream valleys are generally narrow although they may widen locally. Generally, steep and narrow ephemeral draws connect hillslopes with stream valleys.

#### 3.7.1.3 Geology

About 70 percent of the project planning area is underlain by breccia and basalt of the Clarno Formation. About 25 percent of the area is underlain by Columbia River Basalts; these are found mostly along the western edge of East Fork Beech Creek subwatershed and in the southern portions of both subwatersheds. The remainder of the area is underlain by small amounts of miscellaneous formations such as alluvium. A volcanic ash cap overlies about 30 percent of the project planning area, primarily in the upper portion.

#### 3.7.1.4 Soils and Subsoils

Hydrologic response in the project planning area is controlled to a large extent by the variability in surface and subsurface soils derived from the Clarno and Columbia River Basalt formations, by the shallow depths of the soils and their stony texture, and by characteristics of the underlying geology. In addition, the hydrologic responses of the residual soils (derived from parent materials) are moderated by the presence of a volcanic ash cap on about 30 percent of the project planning area, chiefly in the upper portion and to a lesser extent the presence of some ash mixed in with the residual material as described in the Soils Report.

Basalt and andesite (volcanic rocks) occur in the southern portion of the project planning area. They tend to form clay loam soil to clayey loam soils. These soils exhibit very slow permeability and transmissivity, according to the Malheur National Forest Soil Resource Inventory. They also tend to limit detention storage and transmission of soil water (shallow ground water) and support a high rate of runoff. Relatively little water is contributed to late season base flows. These characteristics are ameliorated where the ash cap is present because infiltration rates on ash soils are usually higher, resulting in less overland flow.

The clayier soils are generally derived from the lava flows of andesite, basalt and tuff and the volcanic mudflow breccias and conglomerates of the Clarno formation (about 70 percent of the project planning area); the andesite, basalt, interlayered tuff of the Columbia River basalts generally weathers to loamy to clay-loamy soils (about 25 percent of the project planning area). About 20 percent of the area is mapped as complexes of these two types of soils; a soil complex is an association in which two or more soil mapping units are so intricately mixed that it is not practical to show them at the mapping scale used (Carlson 1974).

Alluvial deposits are found along the lower reaches of perennial and intermittent streams in East Fork Beech Creek Subwatershed. Slight evidence of alluvial deposition is found along Grub Creek and its tributaries.

The ash cap which is found primarily moderates the flashy hydrologic response of the underlying clay to clayey parent materials, when present, by allowing greater infiltration and generating less runoff. However, once the surface ash cap is saturated, characteristics of the underlying subsoils control the hydrologic response (for instance, during snowmelt or extended spring/fall rains).

The hydrologic response of the soils derived from parent bedrock is generally flashy because of the presence of clay in both the surface and subsurface soils and because the soils are relatively shallow. Although loamy ash surface soils tend to infiltrate high proportions of run off, their relatively shallow depth (6 to 18 inches, rarely 24 inches) combined with the presence of clayey subsurface soils, results in a potentially flashy hydrologic response when rates of precipitation or snowmelt exceed the infiltration rate or the storage capacity of the ash layer. The hydrologic response also depends on soil characteristics such as exposure of the tuff layers, clay content, soil depth, ground cover, proximity of non-forest soils, and subsoil characteristics as described in the general soil section above.

The subsoil also often has a stronger influence on runoff than is typical of deeper or loamier soils because of the generally shallow surface soils, regardless of plant cover. This tendency is often intensified on areas of shallower soils, such as those typical of “scab” openings where soils are often less than one foot deep and in areas where the subsoil is clayier and poorly drained.

Ash-capped soils typically support mixed conifer forest stands. The deeper residual soils (soils without the ash cap) typically support ponderosa pine and some Douglas-fir. Undisturbed, forested soils tend to have abundant live or dead ground cover and low to moderate erosion potential, depending on slope. Shallow, non-forested, rocky soils typically support grass and shrub vegetative cover with low amounts of ground cover. Erosion potential on shallow soils is moderate to high or very high; they also tend to produce overland flow. These soils may be found as inclusions in or adjacent to forest stands; their proximity to forest stands may allow overland flow to drain onto forested where infiltration occurs.

Water is considered the limiting soil nutrient in the project planning area due to the climate and natural soil conditions. It is suspected that soil water becomes unavailable to trees about August 15 when past monitoring on the Malheur National Forest indicated that photosynthesis in some tree species declined substantially which is consistent with data from an enhanced SNOTEL on the Malheur National Forest.

Ancient landslides, that appear to pre-date the Mazama ash are located along lower East Fork Beech Creek and in the northwestern portion of the project planning area. More recent landslides occur west of Magone Lake, which formed the lake, and in the northeast portion of the Clear Creek subdrainage. These areas tend to be wetter than the rest of the project planning area because the soil is not clearly sorted into layers and stream networks have not developed.

### 3.7.1.5 Hydrography, Hydrology, and Ground Water

*Hydrography*

The project planning area is characterized by small perennial streams and by numerous intermittent channels and ephemeral draws. The area is drained by East Fork Beech Creek and its tributaries and by Grub Creek and some of its tributaries.

The drainage network in the East Fork Beech Creek Subwatershed is composed of several named streams (Tinker, Lake, McClellan, Thompson, and Clear creeks) and unnamed perennial and intermittent tributaries and numerous ephemeral draws. The drainage network on the Malheur National Forest portion of the Grub Creek subwatershed is composed of upper Grub Creek and numerous, mostly intermittent streams and ephemeral draws. The drainage pattern in both subwatersheds is dendritic. Some of the streams are fish-bearing (see Aquatic Resources Report).

Only a few wetlands appear on the National Wetlands Inventory, although evidence of more extensive wetlands, especially in the headwaters of East Fork of Beech Creek is present. Only a few aspen clones are inventoried (see Silviculture Report).

East Fork Beech Creek subwatershed is considered a “true” subwatershed with one drainage outlet where East Fork Beech Creek drains into Beech Creek. Much of the southern portion of this drainage lies on private land that is elevationally higher than the southern portion of the Forest. Tributaries that originate on this area of private land drain down onto the Forest and into East Fork Beech Creek. This subwatershed is also characterized by a number of private in-holdings in the central and western portions, many of which are located along the East Fork Beech Creek channel or in close proximity to its valley. Consequently, although tributaries from the southern private lands flow across the Forest, their confluences with East Fork Beech Creek are often located on other parcels of private land. In addition, other tributaries drain the inholdings and additional confluences are located on the inholdings. Inholdings totaling about 2 square miles are located mid-slope and usually drain into named tributaries to East Fork Beech Creek. Two 40-acre parcels of Bureau of Land Management Land lie on streams or draws that are tributaries to East Fork Beech Creek.

Grub Creek subwatershed is also considered a “true” subwatershed with one drainage outlet on private land where it drains into the John Day River, about 10 miles upstream of the Beech Creek confluence. However, the drainage pattern of the Grub Creek subwatershed on the Forest differs from that of a “true” subwatershed because about six tributaries in the southern portion drain onto private land with their confluences located south of the Forest boundary on private land. These sub-sub-drainages function independently on the Forest but eventually flow into Grub Creek on private land. The upper portion of Grub Creek and its associated tributaries drain Forest land until it flows onto private land at the southern boundary.

### *Hydrology and Natural Physical Disturbance Processes*

The principal physical disturbance processes are generally controlled by the diurnal freeze/thaw cycles typical of the continental climate or by the pattern of precipitation runoff in response to local soil characteristics and climate.

Soil creep (the detachment of soil particles during freeze/thaw cycles and subsequent movement downslope) is typical of exposed residual soils in this climate. It is widespread and considered the most common erosion process in the project planning area. It is subtle, generally small in magnitude, and pervasive (nearly omnipresent). It becomes more apparent following either large, rare natural disturbances or when exacerbated by human activities (see Legacy Effects section below). Mass movement, such as slumps or landslides, are typical of the Clarno Formation (e.g., the landslide that dammed Lake Creek to form Magone Lake) but are not frequent (see Soils Report for more detail).

Runoff patterns in the project planning area are complex because of the range of conditions associated with the controlling factors, including elevation, topography, climate (especially precipitation and temperature patterns), soils, and geology.

Relatively “flashy” runoff regimes result from the generally shallow residual soils and subsoils, particularly in the southern portion where residual, clayey soils predominate. Flashy runoff regimes result in greater proportions of runoff discharged as overland flow and smaller proportions infiltrating. Residual soil texture and soil depth also limit the amount of soil water storage available and the ease with which it moves within the soil and into the rock formations. Increased overland flow combined with the finely textured soil types and presence of shallow soils contributes to increased natural surface erosion potential on the volcanic soils, some alluvium, and areas of shallow soils regardless of texture and parent material. Soil creep and the tendency to produce overland flow, individually and synergistically, positively reinforce the vulnerability or potential hazard associated with rare, larger runoff events.

High intensity wet storms, including microbursts, with rainfall rates greater than 1 inch per hour, may result in accelerated surface runoff during summers. These storms are usually of short duration (fewer than 30 minutes) and/or limited extent (less than 10 mi2). These storms may result in local erosion, which is usually limited to areas where ground cover is naturally present in low amounts, resulting in sediment delivery to nearby streams and road systems. These storms may also include short periods of higher intensity rainfall, similar to that recorded outside Boise, Idaho in September 1997 (in which approximately 0.4 inches of precipitation was recorded in nine minutes), which can accelerate erosion. Gentle rains occur in spring and fall and may produce overland flow, which may concentrate or cause erosion when the soils become saturated. Saturation most commonly occurs when the duration of these storms is greater than a few days. Snowmelt, which is regulated by diurnal variation, elevation, and aspect may also concentrate or cause erosion once soils become saturated.

The complexity of runoff regime, although not technically considered a disturbance process, contributes to the natural erosion hazard and is vulnerable to alteration by human actions. These human-caused disturbances tend to exacerbate the role of overland flow as a disturbance agent and increase the erosion hazard beyond that associated with natural landscape characteristics.

*Ground Water*

Although the ground water resource underlying the project planning area has not been characterized in detail, it appears the primary opportunities for recharge occur in draws and valleys. Recharge in some valleys may be altered based on legacy effects described in the Human Disturbance, Legacy Effects, and Alterations to Natural Watershed Characteristics and Processes section below. Transmission rates of shallow ground water are described subjectively and in relative terms due to the lack of available information. They vary from very low in the clayey to clay subsoils to moderate or high in the more coarsely textured gravelly and cobbly loams that may be present in valleys. Parent material with cavities, cracks/faults, and interflow zones tend to store ground water, as transmission rates are low. Ground water movement in Clarno soils is not well understood due to the characteristics of breccias and is likely to be highly controlled by unknowable (due to limits of current technology) characteristics of the geology.

### 3.7.1.6 Natural Watershed Hazard

The natural watershed hazard[10], which is based on the inherent characteristics of the topography, climate, geology, and soils, is considered low to moderate in the East Fork Beech Creek subwatershed because of the presence of past landslides in the Clarno Formation and the extensive presence of that formation on moderate to steep slopes, and because of the amount and distribution of shallow soils, particularly in the inventoried roadless area which shed water rapidly. The natural watershed hazard is considered low in the Grub Creek subwatershed within the Forest boundary, although there are localized, generally steeper areas where it may approach a moderate rating and other, flatter areas where the hazard may be considered very low.

### 3.7.1.7 Human Disturbance, Legacy Effects, and Alterations to Natural Watershed Characteristics and Processes

Conditions created by past management activities implemented before the application of watershed best management practices, continue to alter the hydrologic system and its function. The main result of these alterations to natural soil conditions and drainage networks is to continue to accelerate and concentrate overland flow across most of the project planning area. They contribute to ongoing, generally localized erosion (for instance, pedestaling, rilling, shallow headcutting, and base leveling) in ephemeral draws. As overland flow concentrated in ephemeral draws entered intermittent and perennial streams, channel and valley erosion, including headcutting, occurred along drainages throughout the project planning area. Both named and unnamed streams (or segments of streams) and their tributaries and valleys eroded. Riparian function, such as floodplain storage and connectivity to stream channels, flood dissipation, and the availability of some types of habitats in the wider valley bottoms and flatter gradient streams, was highly and extensively diminished.

These conditions may be continuously self-reinforcing, leading to continued alteration of hydrologic processes. Alternatively, they may be interrupted in turn by other natural processes operating at decades- or centuries-long scales, such as the death of trees and the natural accumulation of large downed wood. Alteration of natural conditions by past activities occurs throughout the project planning area including in the Nipple Butte Inventoried Roadless Area and on the acquired lands. Legacy effects remain from past logging practices, associated road building, the reduction in beaver due to trapping and later alteration of potential habitat, and season-long grazing of large herds of domestic livestock.

[10] Natural watershed hazard: The intensity and magnitude of watershed vulnerability and potential response to environmental disturbance based on the physical and biological characteristics of a given drainage before the development of a new state of equilibrium.

### 3.7.1.8 Composite Watershed Hazard

The existing composite watershed hazard[11] (qualitatively evaluated) in the Magone project planning area is considered low (plus) in the Grub Creek subwatershed and moderate (minus) to moderate in East Fork Beech Creek subwatershed, depending on location. Characteristics of the soils and hydrography have been altered by past human disturbance, described in the legacy effects above, implemented without the application of watershed best management practices.

- These alterations continue to influence hydrologic processes and function in assorted ways and slightly increase the vulnerability of the watershed to runoff events.
- These alterations 1) are generally small to moderate in magnitude and occur frequently. They have connected, for instance, along Forest Service road 3600-663, and many ephemeral draws show evidence, such as exposure of fine roots, that erosion traced to disturbance upslope is continuing. The likelihood that additional connections may occur under a variety of runoff events continues. Consequently, the composite watershed hazard rating is higher than the natural watershed hazard rating.
- Composite watershed hazard is also affected by the condition of some channels that have been eroded and "dished-out" to a cobble channel, where the cobble acts essentially as bedrock limiting further downcutting. The result is the channels continue to erode horizontally across the valley floor and accelerate the rate at which they transport water downstream.

Watershed processes often rely on the quantity and quality of connections between hydrologic features, such as those connections between streams or between stream channels and floodplains. Increased connectivity or the potential for increased connectivity (i.e., the production of increased overland flow) is used as the primary basis for evaluating composite watershed hazard, except where increased connectivity, such as between stream channels and floodplains, would tend to dissipate the energy associated with high runoff events. In these locations the parameters are inversely related, with increased connectivity decreasing hazard and decreased connectivity increasing hazard. Watershed hazard (natural and composite) was developed for use as a comparative tool between the existing condition and various alternatives; it is not an absolute measure.

### 3.7.1.9 Watershed Characteristics – Existing Condition for Proposed Activities

#### *Hillslopes (including ephemeral swales)*

Many of the units in the pool proposed for commercial harvest (about 165 units, 7,187 acres, estimated) in both subwatersheds are located on clayey to loamy soils derived from the parent bedrock or on ash soils that overlie the parent bedrock (additional description is included in the Overview section of the Watershed Report and the Soils Report), or on complexes of these soils.

Most forested areas also have abundant ground cover, as described in the Soils Report, where infiltration is at or near potential and overland flow is produced only during intense or high volume precipitation events. Consequently, erosion hazard is low to moderate on most forested soils depending on slope. Forested soils where overland flow is more prone to develop under smaller precipitation events include the areas of breccias and tuff (Clarno) and volcanic (non-ash) surface soils.

[11] Composite watershed hazard: The intensity and magnitude of watershed vulnerability and potential response to environmental disturbance based on the physical and biological characteristics of a given drainage—and human-caused alterations to those characteristics—before the development of a new state of equilibrium.

Although loamy ash surface soils tend to infiltrate high proportions of run off, their relatively shallow depth (6 to 18 inches, rarely 24 inches) combined with the presence of clayey subsurface soils, results in a potentially flashy hydrologic response when rates of precipitation or snowmelt exceed the infiltration rate or the storage capacity of the ash layer.

Naturally-occurring, non-forested, shallow, rocky soils – “scab soils” which support low amounts of ground cover and which produce overland flows are intermingled with forested areas. These areas tend to direct concentrated flows downslope and are susceptible to erosion if concentrated flows from above are directed across them. If downslope soils have abundant cover, overland flows usually infiltrate without eroding. Where down slope soils typically are low in ground cover, for instance, on shallow soils, or are vulnerable to detachment and transport, for instance, ash soils, natural gullies or channels are likely to develop.

The clayey and ash soils in the project planning area are considered sensitive to different kinds of disturbance because of inherent characteristics. These sensitive parameters either contribute to the naturally flashy hydrologic regime by influencing run off patterns and distribution and, consequently, erosion hazard or are vulnerable to these concentrated flows.

Legacy practices have altered run off patterns up- and down-slope of areas proposed for harvest, resulting in greater amounts of overland flow. These changes are exacerbated in the project planning area because of the inherently flashy runoff response, the relatively shallow depth of the soils generally and of the ash cap, in particular, the presence of the clayey subsurface soils, and the proximity and intermingling of shallow, non-forest soils to forested areas.

Some of these flows infiltrate in downslope forested stands, including those proposed for harvest, because ground cover is abundant and slopes are gentle. Some of the overland flows enter the drainage network more efficiently or extend or maintain existing areas of erosion. Soil assessments indicate that most units in the pool of proposed harvest units display detrimental impacts from past management activities on less than 8 percent of the area. In most areas of legacy impacts, recovery has been at a natural rate with no active restoration. But in some areas, such as upper East Fork Beech Creek or upper Clear Creek, recovery has been offset by continuing disturbance, for instance, when dead ground cover (for example, conifer needles) continues to be washed downslope by previously concentrated overland flow, maintaining mineral soil exposure, which, in turn, is reinforcing the overland flow concentration. Legacy activities, in the vicinity of the unit pool, such as roading, skidding, and erosion initiated during season-long grazing, implemented before the development and application of Watershed Best Management Practices continue to have the greatest impact on hillslope function.

**Hillslope Roads**: Roads are the most common disturbance located on hillslopes and swales. About 70 percent of the roads in the project planning area are estimated to lie on hillslopes. For the purposes of this analysis, because of GIS sideboards, hillslope roads are defined as roads located outside riparian habitat conservation areas (RHCAs); this estimate probably underestimates hillslope roads because RHCAs on all categories of streams commonly extend out of the narrow valleys onto the lower hillslopes. However, because some of the ways road segments located in the outer portion of the RHCAs affect watershed function are similar to the how hillslope roads affect watershed function, the following discussions also apply to these segments; additional influences of these segments on streams and valleys are described in the section below that addresses riparian area condition.

Roads on hillslopes interrupt normal hydrologic function by re-routing run off in minor and in major ways. Generally two mechanisms are responsible for most hydrologic disturbance related to roads in the project planning area. One, interception and re-routing of subsurface flow, is common in many forested areas; the other concentration and routing of overland flow, is common in this climate and geology but uncommon in other areas. Most roads in the project planning area capture and concentrate overland flow to varying extents, depending on landscape context and proximity of legacy disturbance. Often the only evidence is a diffuse to moderate distribution of ravel on the lightly defined narrow wheel tracks on the road surface.

These mechanisms are of particular concern in the project planning area where a smaller proportion of run off infiltrates naturally with a greater proportion contributed to overland flow, especially when affected road segments are located in close proximity to shallow soils with limited ground cover and the re-routed flow continues to be concentrated by downslope conditions.

Most commonly hillslope roads re-direct overland flow away from natural drainage patterns to alternative ones:

- If flow concentration is accelerated, for instance by drainage structures, or if the alternative flow path lies on areas of reduced ground cover or shallow soils, the overland flow may continue to accelerate, cause erosion, or both.
- If flow concentration is accelerated, sediment may be eroded from the surface, creating self-re-enforcing conditions like ruts such as those along Forest Service road 3600-544.
- Roads also intercept, concentrate, and re-direct soil water to the surface, causing any or all of the above conditions.
- The continuing impact is usually directly influenced by the road slope and surfacing.

A Geomorphic Road Analysis and Inventory Package (GRAIP) study (Day et al. 2010), conducted on geologies that are similar or slightly more prone to road-related erosion on the adjacent Umatilla National Forest than the project planning area is, showed that about 90 percent of the overland flow and sediment generated from or transported by road surfaces appear to be caused by conditions on or adjacent to about ten per cent of the roads. The GRAIP study incorporated an evaluation of drain points and associated road segments. These results are consistent with the observations and other professional experience of the project hydrologist and informal evaluations conducted by other Malheur National Forest specialists. Concentration of overland flows probably follows a similar pattern based on observations and professional experience. Construction of road berms and the associated excavation, commonly located in close proximity, and subgrade compaction and ditching contribute to the interception of shallow ground water and its direction to the surface; on user-created roads now identified as system roads, compaction results in similar interception. Shallow (generally <1.0 inch in depth) raveling and partially plugged culverts were observed on several road segments indicating that sediment detachment, mobilization and trapping is occurring at generally slow rates since road maintenance probably has not occurred for decades.

Erosion of the road surface (due to multiple factors affecting the road surface) is a third common mechanism associated with forest roads but is relatively uncommon in the project planning area.

Road surveys conducted in summer 2014 evaluated the occurrence of these three mechanisms on closed and open roads in the project planning area, although the presence of light ravel alone was not used as a criterion for noting overland flow. About 10 closed roads or road segments in East Fork Beech Creek Subwatershed are routing overland flow down the road surfaces.

Overland flow is caused by roads concentrating runoff, roads capturing overland flow from adjacent “scabs”, or roads capturing seep discharge, generally from the cutslope, due to inadequate drainage. Four open roads or segments in East Fork Beech Creek Subwatershed are also routing overland flow similarly. The road surveys did not indicate the presence of road drainage problems in Grub Creek Subwatershed.

Other ways hillslope roads may influence watershed function include the following, generally more minor influences. Since much of the project planning area is located on subsoils that are clayey, the tendency for ruts to develop from use under wet conditions is common. Clayey subsoils also may result in rutting on relatively flat road segments or in local depressions where the water collects but is not directed into the drainage network. Road crossings of ephemeral swales may also collect and concentrate run off that would otherwise infiltrate. Concentrated flows are less likely to develop on roads surfaced with gravel or other aggregate, although, occasionally, rills develop in the aggregate. Steeper, native surface roads higher commonly show more channeling and erosion than flatter roads in both subwatersheds.

Roads defined as hillslope roads for this analysis, especially those located just above RHCAs, within 100–250 feet of smaller streams, may impact stream channels and valleys by influencing delivery of overland flow and sediment, especially where runoff from roads is channelized below ditch relief culverts, where outsloping road surfaces inadvertently concentrate flows, or where road location limits the amount of canopy shade provided to streams, for instance.

Roads on lands acquired from the Oregon Lumber company were commonly developed to meet then immediate needs for log haul. These roads are commonly located in draws or beside streams and, because road beds and subgrades were not constructed, drainage was not designed to current standards. These conditions continue to modify hydrologic function and interrupt natural drainage patterns.

An access and travel management plan, the standard way to manage roads on the former Long Creek Ranger District in the 1990s, was implemented in the early to mid-1990s. Numerous roads were closed and decommissioned using then common practices of blocking access and allowing closure or decommissioning to occur at a natural rate. Most of the decommissioned roads were located in or near valleys and remain obviously evident since most road grades have not degraded. These roadbeds still affect riparian function, as described above for existing roads, much as they did 20 years ago. Most of the closed roads are located on hillslopes and continue to affect watershed functioning as previously described.

Roads located on the hillslope portions of RHCAs, commonly more than 50 feet from streams, affect hydrologic function, although, like roads higher on hillslopes, they generally do not constrain streams. They intercept subsurface flow and collect and route overland flow downslope. Because of their proximity to streams, these processes may influence stream function in ways similar to valley bottom roads, especially for processes that are controlled by distance from streams; for instance, these roads are more likely to deliver concentrated overland flow and sediment to streams because filter strips are narrower than for roads located further upslope. Also, their location may prevent the growth and recruitment of large wood to streams. Depending on their proximity to and location relative to streams, they may reduce shading and contribute to increase in stream temperature.

**Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws and valley bottoms, and Magone Lake area)**: PACFISH standard-width RHCAs are identified for the project planning area. The RHCAs of fish-bearing, perennial, and intermittent streams and those associated with other hydrologic features commonly include hill- and toe-slopes and outer portions of valleys along with the landforms such as terraces, floodplains, and valley depressions associated with streams.

- The soil and vegetation conditions located on the hill- and toe-slope portions of RHCAs are usually similar in soil and vegetation to those just upslope.
- Most stream valleys tend to be narrow with local areas of widening. The widened areas often contain stream segments that function as though they were constrained in narrow valleys due to entrenchment caused by past logging and other legacy management practices.
- Many stream channels are disconnected from floodplains as a result of legacy management practices or activities that pre-date the formation of the Malheur National Forest. Disconnection has resulted in reduced floodplain storage and shifts in riparian vegetation, both of which are contributing to reduced ability to dissipate energy associated with high flows. The reduction in hydrologic function reduces the resilience of riparian areas, including their ability to withstand flood events.
- Changes in vegetation include encroachment of conifers, reduction in aspen (abundance and vigor), and colonization by non-native herbs and shrubs.
- Large wood within the active channel and flood-prone area is generally scarce. Stream segments frequently do not meet Malheur Forest Plan standards for large wood or riparian management objectives for other parameters (see Aquatic Resources Report). The potential for future large wood recruitment is variable because streamside stands vary from seedling to old forest in structure and age.
- Valley floors appear to have eroded up to 19 inches based on recent terrace formation and the distribution of stumps.
- Few stringer and bead meadows are present along streams with the exception of some segments of Tinker, Clear, and McClellan creeks. Other streams segments appear to have supported more extensive riparian meadows based on recent terrace formation, the distribution of stumps, and the exposure of tree roots. Relic riparian vegetation important to bank stabilization is scattered in these areas. These conditions reduce the amount of shade provided to streams by vegetation.
- Riparian vegetation appears to be reduced in distribution, extent, size of patches and vigor except for segments along Clear, McClellan, Tinker, and East Fork Beech creeks.
- While high flow events and wildfires are unlikely to occur in any given year, they could occur at any time.
- Riparian areas are oversimplified and lack the structure, either woody or channel morphology to dissipate energy from high flows by allowing them to access floodplains and to infiltrate.
- Shifts in riparian vegetation may support low intensity burning due to low abundance but other shifts, such as encroachment of drier species, may support uncharacteristically intense burning and result in mortality of plants that provide shade since these drier species are not usually capable of re-sprouting.

Most Management Area 3B is incorporated within RHCAs. Two exceptions are aspen and ephemeral draws. Ephemeral draws form the link between the hillslopes and the drainage network and are discussed in more detail in the Stream Channel section.

**Aspen**: The Forest Plan identifies aspen as Management Area 3B. A few stands have been mapped in the northwest project area in upper Clear Creek drainage. Aspen stand condition is described in the Silviculture Report.

**Other RHCA/Riparian Vegetation**: Native vegetation in RHCAs ranges from freshwater emergent species like sedges, which are typical of wetlands, to wetland or drier riparian shrub plant associations to drier meadows and forested stands that are typical of the vegetation on adjacent hillslopes. Valleys become narrower and often shrubby or forested at mid to upper elevations, depending on ground water regimes.

The abundance, variety, and distribution of riparian vegetation, including hardwood shrubs, are reduced in much of the project planning area, generally at lower elevations, where historic season-long or other overgrazing practices were followed; where channels or valley bottoms are eroded to cobble; where the water table has dropped, or where other disturbance has altered soil, channel, water, or shade characteristics. Riparian vegetation along many segments of East Fork Beech Creek and its upper tributaries, particularly those areas formerly owned by Oregon Lumber company; along the upper segment of Clear Creek and its tributaries (above the Nipple Butte Inventoried Roadless Area); and along segments of Grub Creek and its tributaries is substantially altered. Isolated stringer and bead (primarily sedge) meadows are not uncommon in these valleys but their condition is generally substantially altered. Overall, vegetation composition has shifted toward non-native forbs and/or species preferring drier soil conditions.

Riparian hardwoods along other drainages or stream segments, particularly those located in very narrow valleys at mid- to upper elevations along Tinker and Lake creeks, at mid-elevations along Clear and McClellan creeks and their tributaries in the Nipple Butte Inventoried Roadless Area; and along some segments of Grub Creek appear abundant and vigorous. Upland conifer encroachment onto the valley floor and riparian vegetation is present.

Several places in degraded valleys were observed where wood, some less than six inches in diameter, has fallen across a valley, it has trapped sediment and slowed runoff, allowing riparian vegetation to become established.

Riparian resiliency to flooding and other disturbance is reduced along some streams based on the conditions of riparian vegetation. For instance, much of the riparian vegetation and valley soil have been eroded along the segment of an unnamed tributary to East Fork Beech Creek and along the mid and upper segments of East Fork Beech Creek itself. Vegetation in meadow flats along tributaries to Grub Creek has been altered with non-native and forbs and grass-like plants typical of drier environments becoming more abundant.

**Riparian Roads**: Riparian roads are defined as roads located within RHCAs for the purposes of this analysis. See discussion under Hillslope Roads for roads within RHCAs that lie on hillslopes. Since road influence on streams varies with distance from the stream and with the topographic location, roads within 100 feet and 200 feet of streams were also considered for this analysis. About 30 percent of the roads within the project planning area are considered riparian. See Aquatic Resources Report for descriptions of stream crossings and road densities.

Forest Service roads of various maintenance and access levels parallel and cross perennial and intermittent streams (Categories 1, 2, and 4) and ephemeral draws. County roads 18 and 32 parallel perennial and intermittent segments of Grub Creek and perennial segments of East Fork Beech Creek.

Roads are often within tens of feet of stream channels, narrowing the available filter strip to widths that meet the smallest recommended size or less, based on local field evaluations and literature (McNeil 1999).

Filter strips 200 feet wide or filter strips less than 200 feet wide on smaller streams, with lesser flows, where woody debris is present, are generally adequate to trap non-channelized, mobilized sediment. Dust produced at crossings by incidental traffic is not measurable. Since streams are generally considered to be below standard in large wood, especially smaller streams at lower elevations, as a result of historic logging practices, the trapping and filtering capacity of these streams for sediment or dust is considered to be reduced.

Roads alter hydrologic function in several ways, depending on the topographic location within RHCAs. Roads are usually located in valleys and draws that provided easiest access with the least need to move soil at the time of construction, commonly prior to 1970. Additional roads were built in the northwest corner of the project planning area between approximately 1970 and 1990; these roads were generally built to standards that are similar to those in use today. These various roads provide a substantial amount of access to the project area, probably out of proportion to their length. Roads may be located on lower hillslopes or toe slopes; immediately adjacent to and encroaching on stream channels; or within defined channels or on draw bottoms. Some riparian roads cross unmapped, seasonal moist to wet meadows where they appear to be affecting local subsurface water movement.

As with hillslope roads, two other mechanisms, erosion (due to multiple factors, at the road surface) and interception of subsurface flow, are probably responsible for a substantial portion of the watershed disturbance and hazard associated with riparian roads. Road-related disturbance appears to affect riparian condition and hydrologic function in a variety of ways, depending on the local setting.

Although the GRAIP study (Day et al., undated) did not differentiate between sediment contributions from hillslope and riparian locations, it is likely that a higher percentage of drain points delivering sediment are located in RHCAs although the sediment itself may originate on hillslopes. Road hydrology surveys conducted in late summer 2014 identified several road segments affecting riparian function.

**Management Area 12 (Developed Recreation Area) and Management Area 8 (Special Interest Area) – Magone Lake Geological Area at Magone Lake**: For the purposes of the Watershed Report analysis, these two management areas and areas upslope in near proximity are addressed together. Numerous recreation improvements have been constructed in the vicinity of the lake (see Recreation Report). Although many of these improvements have reduced the potential for infiltration by installing impervious surfaces, the application of Watershed Best Management Practices since about 1990 has controlled overland flow and erosion. Two small riparian areas, near the two boat docks, receiving heavy use, are maintaining their vegetative resilience. Roading for access to the recreational developments does not appear to be constraining riparian areas associated with the lake.

**Magone Lake**: Magone Lake was created naturally about 1840 when a large slump from the west blocked Lake Creek and its valley to a depth of greater than 90 feet, the deepest point of the lake, and allowed it to fill. It is a high mountain lake in a climate similar to that for the sub-alpine lakes in the Strawberry Mountain Range; it is frozen for about 6 months of the year. The lake contains a large number of snags that fell over the last 170 years and appears to have developed an ecosystem in balance with the current wood loading.

The previous applications and maintenance of Watershed Best Management Practices in the recreation area are controlling sediment and the concentration of overland flow. The Blue Mountain Ranger District monitors lake condition and water quality informally due to its characteristics, relatively low use, and location high in the watershed where there are few opportunities for nutrient enrichment to occur. The local climate, water temperature, and lake depth combine to form a relatively stable system although there are anecdotal reports of anaerobic conditions occurring once or twice in the last 40 years; the reason is not known. Formal monitoring for plankton/periphyton assemblages, hydrologic dynamics, and phonological events like ice-out does not occur. Cattle are excluded from the lake since the developed recreation area is fenced.

### *Stream Channels (and Ephemeral Draws)*

Stream channels are disconnected from floodplains in much of the project planning area. Stream channels have downcut into valley bottoms, resulting in altered physical characteristics and function. Generally the alteration occurs as one of two types, often depending on the depth of valley materials. Where valley soils are deep, channels have downcut and are defined by either vertical or outsloping banks (stream channel entrenchment). Where valley soils are either naturally shallow (usually because of the presence of bedrock or large particles near the surface) or where much of the valley surface itself has eroded, stream channels have eroded down to a resistant layer resulting in rounded, often over-widened, “dished out” stream beds (valley entrenchment). Stream banks associated with “dished out” streams are often display poorly defined banks, lack morphological integrity, or are often accompanied by oversteepening of side slopes. Often the underlying bedrock or rocky, angular colluvium is exposed and former bankfull elevations may be identified above the current bankfull indicators. Some streams may exhibit a combination of both types of alteration, depending on local soil and geology characteristics. These alterations to channel profile, pattern, and dimensions reduce channel resiliency and the ability of channels to pass high flow events without uncharacteristic alteration. Streams generally do not meet Malheur Forest Plan standards for large woody debris (see Aquatic Resources Report). These conditions are also commonly observed in smaller Category 2 and 4 streams and in ephemeral draws. Wood is one of the major channel forming factors and energy dissipater in streams of all sizes. In smaller streams it commonly acts to slow flows, allowing transported sediment to be deposited before it reaches larger streams.

Where disturbance was most intense, primarily in streams on land formerly owned by the Oregon Lumber Company and in the lower portion of East Fork Beech Creek, streambeds are now composed of cobbles, are deeply entrenched, and are generally resistant to further impacts. These stream beds primarily function as conduits to pass water downstream and provide few other stream or riparian functions such as water storage, riparian ecosystems, or flood water storage. Other segments of tributaries to both East Fork Beech Creek and Grub Creek are entrenched and straightened, generally in valleys of finer materials. Entrenchment has resulted in reduced floodplain storage and shifts in riparian vegetation. These conditions have resulted in the reduced ability to dissipate energy associated with high flows and the reduced ability to maintain channels, including stream banks. Precipitation and snowmelt that are not captured and stored higher in the subwatersheds are concentrated and leave the landscape rapidly.

In some cases, legacy management practices, or erosion resulting from those practices, have resulted in “dished out” streams, where the distinction between bed and banks is not clear, for instance along, segments of East Fork Beech Creek and several of its Category 4 tributaries and tributaries to Grub Creek. The upper segment of Grub Creek is eroding; as it widens it may become dished out.

Stream channels appear vulnerable to erosion as demonstrated by responses to multiple events across the Malheur National Forest. The resiliency of the streams is reduced, increasing the watershed hazard.

Ephemeral draws are considered the connection between hillslopes and stream channels. Generally ephemeral draws are low in down wood, reducing their filtering capacity as described for the smaller stream channels.

Approximately 100 miles of ephemeral draws have been estimated to be showing small amounts of active erosion in the project planning area. These are located in both subwatersheds and are most frequently located in the lower third of the hillslopes. Some are tributaries directly to Grub Creek or East Fork Beech Creek. Most erosion was initiated by legacy activities that either channeled overland flow down the draws or reduced ground cover or both. In some cases past grazing practices such as salting in draw bottoms, poorly designed/located culverts, or poor road location concentrated overland flow that resulted in erosion. Evidence of erosion ranges from pedestaling of live ground cover to mineral soil exposure along overland flow paths to rills (< 4 inches deep) and shallow gullies (>4 inches deep). Active erosion continues partly due to the lack of downed wood in draw bottoms and, in some places, the lack of ground cover recovery.

Both the reduced amounts of downed woody material and the on-going erosion tend to increase the watershed hazard.

### *Water Quantity, Timing, Hydrologic Response, and Ground Water*

The common stream flow regime is snowmelt dominated and controlled by elevation. Observation and comparison with similar drainage basins downstream indicate that peak flows occur from mid-March to early June, depending on annual weather patterns and drainage size. Factors that contribute to peak flow are variable. The size of drainage areas of tributaries to either East Fork Beech Creek or Grub Creek ranges from a few acres to about 10,000 acres. Peak flow patterns are also influenced by the wide range of elevations in the project planning area, annual snow accumulation and characteristics, warming trends, and precipitation characteristics. For instance, snowpack in the Upper John Day Sub-basin, is variable, providing as little as 22 percent and as much as 82 percent of the annual precipitation, according to a nearby SNOTEL site (USDA Forest Service 1999). Following meltoff, stream flows decline gradually until late September or early October when low flows occur.

Rain events at low elevations within the normal snow accumulation period are not uncommon. They usually result in short term decreases in snowpack or melt off and brief periods without snow that are often followed by re-accumulation of snow. Rapid snowmelt at higher elevations may occur during late spring rains after similar, earlier melt-out events at lower elevations. Consequently the patterns of snowmelt and rapidly increasing stream flow are often more variable than in other locales.

The effect of convection storms (thunderstorms) on stream flow may range from negligible to substantial, depending on a number of factors related to the storm. Similarly the effect of storms on stream flow in the project planning area is variable because storms often track either downstream (to the north) or across the watershed (to the east), resulting in either more pronounced or moderate effects on stream flow.

Past activities that altered upland and ephemeral draw soils as described in the Hillslope section and roading and skidding along streams influence snowpack accumulation and melt-out and runoff from convection and other storms. The quantity and timing of runoff has been modified by disturbance; smaller amounts of runoff infiltrate and greater amounts of overland flow run off the landscape faster and earlier. Runoff is not captured, stored and safely released at the appropriate time.

Studies from areas with different climates and soils indicate that harvest may influence runoff. Helvey and Fowler (1995) found that peak flows resulting from snowmelt do not increase following the creation of 60 percent of an area in hydrologic openings from timber harvest on a nearby forest. Results for the creation of openings, in which more than 90 percent of trees have been removed are mixed, depending on the method of analysis. They also found that peak flows from snowmelt occur earlier when openings are created. A cursory review of past harvest indicates that created openings are below these thresholds.

Ephemeral draw condition is a primary influence on changes in seasonal runoff volume and rates.

**Ground water**: The existing condition is discussed in more detail in the Overview section of the Watershed Report.

### *Water Quality*

The John Day River Basin total maximum daily load (TMDL) and Water Quality Management Plan (WQMP) was completed by Oregon Department of Environmental Quality as lead agency in December 2010 (ODEQ 2010). The TMDL primarily addresses temperature in the basin, including that in streams in the project planning area. A TMDL effectively de-lists streams formerly on the State Clean Water Act Section 303(d) List of Water Quality Impaired Waterbodies and shifts legal requirements for water quality management to state-identified Designated Monitoring Agencies under state-approved Water Quality Management Plans. The Forest Service, as a Designated Monitoring Agency, with the Umatilla National Forest as the lead, completed Water Quality Restoration Plan as required in the TMDL and WQMP. Consequently, while none of the streams in the project planning area are included on the most recent 2010 list for temperature, the conditions (e.g. not meeting stream temperature standards for various beneficial uses) which caused them to be listed remain. Water temperatures in other perennial streams are considered to be elevated; these streams are automatically included in the Total Maximum Daily Load and Water Quality Management Plan by the Department of Environmental Quality and, as such, are included in the Forest Service Water Quality Restoration Plan.

In addition, East Fork Beech Creek was added to the 2010 CWA Section 303(d) list for the parameter of biocriteria in December 2012 during the EPA review of the 2010 list. Although the Oregon Department of Environmental Quality included the parameter of the biocriteria in the John Day Basin TMDL and WQMP because of its often close correlation with temperature, EPA's method of listing indicates that because the stressors affecting biocriteria are not known, the additional stream segment cannot be included in the existing TMDL and WQMP for the John Day River Basin. Therefore, East Fork Beech Creek remains on the CWA Section 303(d) list. The listing for biocriteria indicates that the populations of macroinvertebrates sampled in East Fork Beech Creek are not as diverse as Oregon Department of Environmental Quality would expect to find.

*Composite Watershed Hazard*

Since the natural watershed hazard is based on the tendency of the project planning area climate, geology and soils to produce overland flow, the composite watershed hazard is increased by disturbance that either produces additional flow, reduces infiltration, or captures natural overland flow and concentrates it.

The factors of greatest influence on watershed hazard, resulting from past and ongoing management activities, appear to be the presence of riparian roads, the hydrologic and vegetative condition of riparian areas, the condition of non-forested hillslopes, the extension of stream channels and modification of both channels and some hillslopes by past activities. Hillslope conditions resulting from past logging are generally recovering. The impacts of hillslope roads are limited in extent and intensity. Rare, large run off events are expected to increase erosion in eroding ephemeral draws and Category 4 steams and may initiate additional erosion paths on sensitive soils. Run off from some hillslope roads, riparian roads and exposed mineral soil is expected to increase the volume of flow and sediment. Considering only the types, distribution, magnitude and intensity of legacy and ongoing disturbance, overall watershed hazard is slightly higher than under undisturbed conditions. This slight increase is also influenced by the typical response resulting from interactions between the types of human-caused disturbance present and the natural hydrological characteristics.

## 3.7.2 Environmental Consequences

### 3.7.2.1 Indicators for Assessing Effects

The following measurement indicators (also described above) are used for assessing the effects to rangeland resources in the Magone project planning area:

- Effects to hillslopes (including ephemeral swales)
- Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws, and valley bottoms)
- Stream channels (and ephemeral draws)
- Water quantity, timing, hydrologic response, and ground water
- Water quality
- Impacts to the Nipple Butte Inventoried Roadless Area
- Watershed hazard

### 3.7.2.2 Methodology

Streams and ephemeral draws in the project planning area were mapped using a combination of U.S. Geological Survey topographic maps, information in the Malheur National Forest geographic information system (GIS), and recent field reconnaissance of streams and draws by the project hydrologist, other aquatic specialists, and the watershed field crew.

Effects of fuel reduction on water quality, large wood, and other parameters affecting watershed function were reasoned based on the experience of the project hydrologist, knowledge of local watershed processes and history, and a brief review of primarily local literature. The effects of proposed activities are analyzed and described in the portion of the watershed where they occur or which are affected. Watershed processes and function from the watershed divide to stream flow were considered.

Considering watershed function on this scale allows evaluation of watershed hazard, which is a composite of conditions, including connections between different types of disturbance, throughout the watershed. The time scales considered for analysis range from one year to several decades. The time scale is defined for many parameters analyzed; 1 to 10 years is the default time scale if it is not defined or referenced in the analysis discussion.

Cumulative effects on water quality, watershed hazard, and other watershed processes were assessed, using professional judgment, by considering the watershed processes and characteristics of the analysis area, the proposed treatment, and past and on-going activities and events. Additional assumptions are found in Appendix WS-E of the Watershed Report and for watershed hazard, in Appendix WS-K.

### *Assumptions*

1. PACFISH stream category designations in the Malheur National Forest GIS were used for this analysis except where field observations did not validate the GIS; corrections based on field observations were incorporated into the analysis. For instance, some mapped Category 4 streams are more appropriately considered to be Category 3 or 4 wetlands that lie in ephemeral draws or swales because they do not have defined or active channels and because different local guidelines for interpreting INFISH for field mapping were in use at the time the data were entered into the Forest GIS. In addition, the U.S. Fish and Wildlife Service's National Wetland Inventory has been incorporated into the Forest GIS since the area was mapped.
2. Understanding of the hydrologic system and its functioning is based on field observations, application of professional principles, and professional experience and judgment because few scientific studies applicable to the project planning area have been conducted.
3. Use of rubber tired skidders for removing commercial material, including biomass, and grapple piling is assumed because this combination of equipment tends to have the greatest effect on soils and hydrologic condition compared to the other available harvest systems. Use of cut-to-length systems and feller bunchers tends to disturb less ground as discussed in the soils report; use of these alternative logging systems is assumed to cause fewer impacts to hydrologic functioning than that analyzed.
4. The proposed action incorporates the design elements included in the appendices of the Watershed Report and in Chapter 2 of this DEIS.
5. The proposed action incorporates the Watershed Best Management Practices (BMPs) listed in the appendices of the Watershed Report and the appendices of this DEIS. The BMPs would be implemented as prescribed.
6. Prescribed burning will be implemented as prescribed or to a lesser extent or intensity or extinguished.
7. Fire behavior, whether classified as characteristic or uncharacteristic, would be consistent with that described in the Fire, Fuels, and Air Quality Report.
8. The existing condition for this analysis is considered preliminary preparation for an "Ecosystem Analysis at the Watershed Scale" for the portions of the two subwatersheds (located in two separate watersheds) included in the project planning area.
9. Other assumptions may be stated within the analysis.

### *Incomplete and Unavailable Information*

Watershed conditions within some of the various inholdings within the project planning area are generally unavailable. Conditions on others is known from a variety of sources including published information (including maps), various levels of partnership (formal or informal), or visual observations from public roads or lands. Some routine stream data are unavailable because the nearest stream gaging station of reasonable record is located more than 20 miles downstream and encompasses a much larger area; collection of other hydrologic data has been limited within or near the project planning area.

Because watershed science is not exact and few data are available, the common practice for watershed specialists, like other earth scientists, is to integrate available information with knowledge of basic principles of watershed science and with the physical and biological characteristics of the landscape. Integrating these factors results in a reasoned understanding of watershed condition functions, and processes. This understanding can be used to evaluate effects of proposed activities. For the Magone Project, this understanding is laid out in the Existing Condition that forms the basis for the comparison of alternatives. This process of integration of available information with basic principles is consistent with 40 CFR 1502. 22 (Unknown and Unavailable Information); see the Information Sources Section for how gaps are addressed and how the missing information was addresses in analyzing and discussing effects of the proposed activities and associated conclusions.

### *Spatial and Temporal Context for Effects Analysis*

Setting the direct and indirect effects boundaries for the watershed resource in this project planning area is not routine due to its location in two subwatersheds that are in separate watersheds and whose drainage outlets are located miles apart and “arbitrary” delineated land ownership boundaries. The spatial boundaries are defined by the Forest ownership in the East Fork Beech Creek and Grub Creek subwatersheds. Watershed hazard is used to integrate the effects on watershed condition, process, and function.

The temporal boundaries for analyzing the direct and indirect effects vary from immediately after the proposed activity is implemented to one year later to several years, decades, or centuries later. The reason for the wide range of temporal considerations is that watershed processes, especially those in an altered landscape like the project planning area operate at variety of temporal scales. These time periods are defined in the effects discussion; generally the temporal scale would be 1 to 10 years if not defined.

Setting the cumulative effects spatial boundaries is challenging for the reasons described for setting the direct and indirect effects boundaries. They are set to the same subwatershed boundaries as previously described for the reasons described. Cumulative effects from other activities on Forest Service lands, with the potential to interact with the direct and indirect effects, would occur above the Forest administrative boundary, which is the boundary for direct and indirect effects. Cumulative effects from other activities, not on Forest Service lands, were considered after the direct and indirect effects from the proposed activities were analyzed. Because these effects are expected to allow recovery of previously impacted stream channels, riparian areas, and hillslopes to occur at a near natural or greater rate, and because resource conditions and activities on private lands are difficult to determine, the cumulative effects boundary is limited to the Forest boundary for discussions of specific parameters.

Also the hydrologist considered that, generally, using the principles of the watershed discipline, as described elsewhere, effects that would result from recovering hydrological systems higher on the hillslopes (e.g., on National Forest lands) would be expected to reinforce recovery occurring on land below or to positively counter on-going hydrological disturbances, if any are present. To analyze the expected effects with any further specificity such as magnitude or duration would be hypothetical in this geographic setting. Watershed hazard is used to integrate the effects on watershed condition, process, and function. Timeframes considered are similar to those described for direct and indirect effects.

#### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

The activities listed in Table 13 and Table 14 of this DEIS prepared for the Magone Project were reviewed. Ground disturbance or moderate exposures of mineral soil caused by previously implemented activities, such as historical and recent harvest or mechanical thinning/piling, soil compaction or other soil modification that limits infiltration or concentrates, channels, or redistributes overland flow was considered in evaluating and describing existing condition. The effects of fires were not because none are of sufficient size or recent enough to affect watershed function. Additional activities such as past and present grazing, past stream projects, developed recreation including trails, dispersed recreation and firewood gathering, activities under special use permits, mining, and roads management including location and management of open and previously closed or decommissioned roads were considered in developing the existing condition. Most of these activities were implemented before the development and application of Watershed Best Management Practices and resulted in greater ground disturbance than results from activities implemented in the more recent past, about the last quarter century, or would be expected in the future. Foreseeable activities considered include activities authorized under the Aquatic Restoration Decision and any others associated with ground disturbance.

### 3.7.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

The conditions and processes described for the existing condition would continue.

No activities are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects from newly implemented management activities are expected. In the absence of uncharacteristic wildfire, on-going watershed processes would continue to function in response to the existing conditions. Upland and ephemeral swale conditions are expected to remain similar to those described in the existing condition in the near term, for about 3 to 10 years.

Where erosion has stabilized and areas or volume of overland flow concentration is diminishing in response to ongoing changes in the landscape, ephemeral draw and upland conditions would gradually recover from past impacts over decades. Small amounts of coarse woody debris, such as branches, would accumulate in the draws, slowing runoff and enhancing infiltration. Compaction and other soil impacts caused by skid trails and roads, landings, and other past logging impacts would gradually recover as described in the Soils Report. Ground cover, either dead (needles) or alive, would accumulate on most areas where mineral soil is exposed. These conditions would tend to moderate the current watershed hazard and allow greater amounts of run off to infiltrate in these areas in small to large (rare) run off events.

Where erosion is not stabilized, where mineral soil is exposed, or where rilling, gullying, or raveling, for instance, occur, conditions are likely to continue or gradually expand downslope, deepen, or widen into more extensively over decades. In these areas proportionately less runoff would infiltrate and more overland flow would be concentrated and routed downslope.

Under some conditions, as described in the Fire, Fuels, and Air Quality Report, wildfire would be expected to burn characteristically, with mineral soil exposed on less than 10 to 30 percent of the burn area, depending on the vegetation type and fire regime. These areas would be likely to infiltrate runoff and produce very little additional overland flow, after the first year, and result in little change to watershed hazard. Under other conditions, wildfire would burn with uncharacteristic intensity, resulting in moderate and high severity impacts to the soils. Extensive areas of mineral soil, which would be vulnerable to accelerated erosion or would concentrate overland flow, in the case of rare runoff events, would be exposed until ground cover recovered. Greater amounts of hydrophobic soil and over-drying would be expected to occur and would be distributed more contiguously in the areas of higher severity burns. These conditions would tend to contribute to increased watershed hazard.

Foreseeable activities such as scattering woody material on about 300 acres of shallow, non-forest soil would slow overland flow and promote greater rates of infiltration and allow faster rates of recovery from past impacts. Scattered wood would also provide some buffering of increased overland flows resulting from rare, large runoff events.

**Hillslope Roads**: No change in location, number, or condition of hillslope roads (including those in the “pool” of roads considered for this project) from that described in the existing condition would occur. The influence of hillslope road condition on watershed hazard would be likely to remain similar to the existing condition in the absence of rare, large runoff events. Roads currently channeling runoff would continue to concentrate runoff in the absence of maintenance.

Accelerated erosion may result downslope of areas where flows are concentrated, especially where downslope ground cover is not abundant, either naturally or as a result of past disturbance. Watershed hazard would be similar to that described for the existing condition.

**Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws and valley bottoms)**: No activities in RHCAs or MA 3B are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects from management activities would occur.

The most likely effect under alternative 1 is little to no change in RHCA condition since neither rare (large) runoff events nor uncharacteristically intense fire are likely to occur in a given year.

Conditions in RHCAs or MA 3B are expected to remain similar to those described for the Existing Condition for up to three to ten years. Riparian vegetation condition would be maintained or improved under normal runoff events. Fuels would continue to accumulate in RHCAs as wildfires are suppressed. Intensity of wildfire in RHCAs and MA 3B would be influenced by fuel conditions within these areas and on the adjacent hillslopes.

Uncharacteristic wildfires would be likely to burn with high intensity resulting in uncharacteristic amounts of medium and high severity impacts to the soils. Wildfire impacts such as hydrophobic soil and over-drying, would increase watershed hazard (see Watershed Hazard discussion below). Riparian vegetation may be pre-dried, under some conditions, by fire on the hillslopes, resulting in increased burn severity.

Riparian ground cover would be maintained or slowly accumulate because riparian burning of either hand piles or broadcast prescribed fire in the outer portions of RHCAs would not occur.

Most RHCA and MA 3B conditions would gradually recover from past impacts. Coarse wood would continue to accumulate in these areas, enhancing infiltration. Compaction and other impacts to valley bottom and toeslope soils caused by past logging impacts would gradually recover as described in the Soils Report. Trampling and browsing attributed to wildlife would continue, allowing generally local areas of mineral soil to be exposed with the potential of erosion and the growth of hardwood shrubs generally in isolated patches to be arrested. Cattle grazing would be expected to meet Malheur Forest Plan standards and would not expose sufficient mineral soil or impact hardwood or other riparian plant growth to measurably affect riparian function. Overall riparian vegetation would be expected to continue to expand gradually in distribution, abundance, species composition and vigor. Roads currently channeling runoff are likely to continue to concentrate runoff in the absence of maintenance. The use of open roads would continue to produce dust during extended dry periods, which occur most commonly during the summer and fall.

Fuel loads would slowly accumulate as described in the Fire, Fuels, and Air Quality Report. Insect and disease would become more common, likely resulting in mortality, as discussed in the Silviculture Report, and making additional wood available for recruitment into streams. Alternative 1 would be consistent with PACFISH standards FM 1 and 4 since conditions would generally be maintained or improved. In the event of a rare runoff event, channel and valley bottom erosion would affect riparian conditions and processes in the inner RHCAs of some sub-drainages. Numerous small dead trees and other vegetation conditions would contribute to heavy fuel loads as described in the Fire, Fuels, and Air Quality Report. In the event of uncharacteristic fire, the outer portions of some perennial RHCAs and the inner and outer portions and stream banks of some intermittent RHCAs are likely to burn severely, exposing mineral soil and possibly forming hydrophobic soils (see Soils section). Exposed mineral soils and hydrophobic soils increase watershed hazard and would result in delivery of sediment and increased runoff into streams or onto the outer portion of valleys. Locally severe fire would be expected in some RHCAs. Locally severe fire may also occur in other RHCAs depending on the pattern of burning. Most trees in some RHCAs would be killed, providing relatively small coarse woody debris within 10 years, and delaying the growth and recruitment of large woody debris for decades. Cover in many of the RHCAs would be reduced until forest stands are re-established (see Vegetation section). Some larger trees may be killed and would provide large woody debris for future recruitment earlier than in the absence of fire.

Uncharacteristic fire that enters the downstream portions of RHCAs would likely burn intensely up drainages due to the topographic “chimney” effect. This pattern of burning is likely to result in localized severe burn in RHCAs where down or standing fuel loads are heavy. Some or all of the riparian vegetation in the inner RHCAs would be burned to the root collar or crown, temporarily removing shade along perennial streams and killing the drier vegetation found along intermittent streams. Re-sprouting of riparian vegetation would occur during the next growing season with shade recovery occurring in 1 to 10 years, depending on riparian species present (sedges or shrubs). The effect on vegetation along drier intermittent stream banks would be similar to that described for upland vegetation. Sediment-filtering and trapping potential would be reduced until live and dead ground cover re-established.

Placement of coarse wood and large wood as well as removal of impedements such as levees, earthen berms, and undersized culverts in valleys under foreseeable activities implemented under the Aquatic Restoration Decision would slow overland flows, trap sediment, dissipate energy, and promote riparian recovery over the following 2 to 3 decades.

**Aspen**: No aspen treatments are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects on aspen or from proposed activities are expected. Aspen stands would continue to grow as described in the Wildlife/Silviculture section; mortality may increase as a result of continuing conifer competition. Small amounts of coarse woody debris, such as branches (and, eventually, stems), would accumulate around aspen, slowing runoff and enhancing infiltration.

**Riparian Roads**: Existing conditions described for riparian roads would continue and associated impacts on riparian functioning would persist. Segments of East Fork Beech Creek, Grub Creek and other streams and their tributaries would continue to be constrained by various roads. The pool of large woody material for future recruitment into streams and riparian areas would continue to be reduced due to the location of roads. Stream channel recovery from the impacts of legacy management practices would be prolonged.

### Stream Channels (and Ephemeral Draws)

No activities within stream channels or along stream banks are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects from management activities are expected. Stream bank and channel stability and coarse woody debris recruitment would be expected to remain about the same as that described for the existing condition for up to 3 to 10 years. Ongoing watershed processes would continue to function in response to the existing conditions. Stabilized head cuts and cut banks are expected to remain stable under common runoff events but would remain vulnerable to unexpected high flows, regardless of cause. Stability is expected to improve gradually as riparian vegetation communities continue to expand in distribution, abundance, species composition, and vigor as described in the RHCA section. Entrenched channels may aggrade gradually as coarse woody material accumulates or beaver become more active.

In the event of uncharacteristic wildfire, large woody debris recruitment would be increased, accelerated or, alternatively, delayed and reduced in the near term, depending on the stand characteristics adjacent to particular stream segments. In the case of rare runoff events, individual tributaries may downcut in proportion to the intensity and distribution of the runoff. Stream functions may be altered similarly. Sub-drainages at most risk include those where stream channels or riparian vegetation are currently disturbed or where upland conditions are currently concentrating runoff.

Placement of coarse wood and large wood as well as removal of impedements such as levees, earthen berms, and undersized culverts in valleys under foreseeable activities implemented under the Aquatic Restoration Decision would slow overland flows, trap sediment, dissipate energy, and promote riparian recovery over the following 2 to 3 decades resulting in narrower stream channels and less “cobble” dominated streambeds.

### Water Quantity, Timing, Hydrologic Response, and Ground Water

No activities are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects to snowpack, annual water yield, peak flows, or minimum flows are expected.

Ongoing watershed processes would continue to function in response to the existing conditions and the inherent feedback loops that are part of those processes. The gradual recovery of most upland, RHCA (and MA 3B), and stream channel conditions as previously described is expected to result in water quantity parameters shifting toward the patterns which existed prior to European-American settlement, although this shift is considered to be unmeasurable due to the complexity associated with sampling. Where watershed conditions do not improve or continue to degrade, for instance, in areas of raveling or where road segments that concentrate and channel runoff, water yield would continue to be accelerated and contribute to lower summer flows.

**Ground Water**: Recharge of ground water would continue as described for the existing condition.

**Water Quality**

No activities are proposed under alternative 1. Since no activities are proposed, no direct or indirect effects to water quality are expected. Ongoing watershed processes would continue to function in response to the existing conditions and the inherent feedback loops that are part of those processes. The gradual recovery of most upland, RHCA (and MA 3B), and stream channel conditions as previously described is expected to result in improvement of characteristics, such as narrow, deep streams and shade from riparian vegetation that contribute to lower summer water temperatures. These conditions are expected to develop over much of the area but isolated areas of disturbance due to wildlife travel and impacts from ongoing activities or conditions such as rilling or roading would continue. Similarly, small amounts of disturbance to riparian conditions, which are not expected to cause measurable changes in conditions, are permitted under grazing permits and would be expected to continue. Improvement in conditions which influence water quality are not expected to be measurable for at least 10 years because of lag time associated with the establishment and growth of riparian species, particularly hardwood shrubs and trees. Improvement in riparian vegetation would also enhance the filtering and sediment trapping capacity of riparian areas. Rare events that result in alternations to channels may result in temporary, probably unmeasurable, increase in temperature. These conditions would last until riparian vegetation reestablished itself. Changes in stream temperature would also be dampened by the presence of conifer shade. Uncharacteristic wildfire would be likely to result in the loss of conifer and hardwood shade, resulting in increased temperatures for about 10 to 30 years or until streamside vegetation either matured (riparian hardwoods) or conifers became re-established. Biocriteria conditions are expected to track with temperature conditions since temperature is a primary influence on biocriteria conditions. In addition, the changes in amount and diversity of biomass described above would be expected to contribute to conditions that would support more abundant and diverse macroinvertebrate populations and improve biocriteria conditions.

**Nipple Butte Inventoried Roadless Area**: The conditions described in various sections of the existing conditions would continue indefinitely in the roadless area. The effects of wildfire, as described in the Fire, Fuels, and Air Quality Report, on watershed function would be variable, as described for the entire project planning area, depending on a number of factors.

**Composite Watershed Hazard**

No additional disturbance would occur. The watershed hazard would remain the same as the existing condition for the short-term. The condition of riparian roads would continue to limit stream channel recovery. Over the long-term watershed hazard would generally decrease as recovery from past activities continues, although localized areas of active erosion would continue as chronic, localized hazards.

*Cumulative Effects*

Because there are no direct or indirect effects, no cumulative effects, according to the CEQ definition, would occur. Foreseeable activities, such as ones related to aquatic restoration, included in Table 14 for alternatives 2, 3, and 4, would be expected to occur. Restoration similar to that described cumulatively for the action alternatives would be expected to occur, resulting in a reduced watershed hazard rating, as a result of reducing the disturbance that catches, concentrates, channels and redirects overland and stream flow.

**Foreseeable Activities**: The foreseeable activities that are authorized under the Aquatic Restoration Decision, ranging from culvert replacements, to large and coarse woody debris placement in streams and draws and on scabs, and installation of beaver support structures are expected to improve riparian vegetation, floodplain function, stream channel function, rates and timing of runoff, and water quality in complement to the activities included in this analysis. Improving watershed condition, function, and processes or "capturing, storing and safely releasing runoff" would reduce watershed hazard to Medium Low at the first year and toward Low over one to three decades as the aquatic treatments became fully effective and legacy disturbance continued to recover. Grazing to Malheur Forest Plan standards, as amended, is expected to result in improving riparian conditions that would complement the reduction in watershed hazard.

### 3.7.2.4 Alternative 2 – Proposed Action

*Direct and Indirect Effects*

**Hillslopes (including ephemeral swales)**

Effects are discussed at year 1, year 5, and year 10 and for several decades. Year 1 was chosen because exposure of mineral soil and other ground disturbance is likely to be greatest at that point. The assumption is made for this analysis that most harvest and temporary road activities would occur in year 1. Year 5 was chosen because of the likelihood that effective ground cover would have become reestablished on disturbed areas, as described in the Soils Report. Year 10 was chosen because decompaction of affected areas would have been initiated by natural processes. Decompaction and other impacts may take several decades to recover. Table 63, Table 64, and Table 65 display the proposed activities by yarding system and subwatershed.

The most likely effect on overall watershed functioning from yarding and landing on hillslopes and ephemeral swales under alternative 2 is little or no change when individual units are considered, compared to alternative 1, because Best Management Practices (BMPs; see Watershed report Appendix WS-G) and Project Design Criteria (PDCs; see DEIS Appendix C) associated with the proposed activities are expected to control runoff and sediment transport under common runoff events. BMPs and project design criteria were designated for more sensitive soils such as the shallower Clarno soils or shallow, forested Clarno soils that are in association with non-forested soils (see Soil Report). When the sum of the proposed units and their distribution across the landscape is considered, the additional disturbance raises the watershed hazard proportionately (discussed below) compared to alternative 1.

The Soil Report indicated that detrimental impacts in most tractor yarding units are expected to increase from current condition (commonly, zero to 8 percent of the unit area) to 6 to 14 percent of the unit area, depending on the specific unit. Minor amounts of erosion (see soils) and overland flow maybe generated within units during runoff events.

Overland flow is expected to infiltrate within unit boundaries since ground cover will be maintained over most of the area. Although sediment may be detached where mineral soil is exposed within harvest units, it is likely to be trapped by ground cover and would be unlikely to be transported beyond unit boundaries.

Initially Watershed Best Management Practices, including site-specific project design criteria would be expected to control erosion and concentration of overland flow on 32 segments of temporary road (9.2 miles) for one to several years. They would not be restored to productivity for up to three decades after use. Re-establishment of ground cover would control sediment and runoff until productivity was restored.

Because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including extensive roading outside the Nipple Butte Inventoried Roadless Area, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions and, possibly, extend the drainage network headward or create concentrations of runoff or sediment that could be transported beyond unit boundaries. However, overland flow is not expected to be concentrated enough to cause accelerated erosion or to deliver increased sediment to live streams in most locations under common rainfall events. Maintenance of ground cover over much of the area is likely to slow and absorb runoff and trap sediment. Filter strips along streams are narrow and, in some cases previously disturbed; infiltration of overland flows and sediment trapping capacity of RHCAs are limited. This vulnerability is greater on the portions of 10 units (about 300 acres) and 9 units (about 400 acres) where tractor yarding is proposed on residual soils derived from breccias and tuff in East Fork Beech Creek and Grub Creek subwatersheds, respectively, and to a lesser extent on the 40 units (about 650 acres) and 20 units (about 400 acres) where tractor yarding is proposed on ash-covered (or partially ash-covered) Clarno soils than on the remaining units located on soils derived from volcanic andesite and basalt. Similarly BMPs associated with the proposed activities are expected to control runoff and sediment transport in the units where biomass harvesting is proposed, which may be in addition to those summarized in the tables.

These conditions would contribute to elevation of watershed hazard as discussed below. The extended drainage network would also increase watershed hazard associated with future rare runoff events; these effects are discussed in the Watershed Hazard section below.

**Table 63. Summary of harvest units by proposed yarding system (tractor, skyline, or both) by alternative in the Magone project planning area**

| Yarding system | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Area yarded by tractor (acres) | 0 | 3,677 | 5,650 | 2,955 |
| Area yarded by skyline (acres) | 0 | 333 | 305 | 243 |
| Area yarded by combination of tractor and skyline (acres) | 0 | 676 | 1,229 | 372 |
| Total area yarded (acres) | 0 | 4,686 | 7,184 | 3,570 |

**Table 64. Area yarded by tractor, skyline, or both in the East Fork Beech Creek subwatershed by alternative**

| Yarding system | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Area yarded by tractor (acres) | 0 | 2,466 | 3,957 | 1,854 |
| Area yarded by skyline (acres) | 0 | 247 | 219 | 178 |
| Area yarded by combination of tractor and skyline (acres) | 0 | 676 | 1,053 | 371 |
| Total area yarded (acres) | 0 | 3,389 | 5,229 | 2,403 |

**Table 65. Area yarded by tractor, skyline, or both in the Grub Creek subwatershed by alternative**

| Yarding system | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Area yarded by tractor (acres) | 0 | 1,209 | 1,683 | 1,103 |
| Area yarded by skyline (acres) | 0 | 86 | 86 | 66 |
| Area yarded by combination of tractor and skyline (acres) | 0 | 0 | 177 | 0 |
| Total area yarded (acres) | 0 | 1,295 | 1,946 | 1,169 |

About 48 miles (12 segments) of biking and hiking trails would be constructed or designated as described in the proposed action. Adhering to project design criteria during construction is expected to control sediment and overland flow. Application of project design criteria would control sediment and overland flow at newly developed trailheads.

Retaining limbs and boles from juniper thinning and thinning of other conifers encroaching on shallow soils or filling in open woodlands would promote recovery of watershed function in these areas by slowing overland flow and enhancing infiltration. Live ground cover would be expected to increase after about 5 years.

**Hillslope Roads**: Few changes in hillslope roads are proposed under alternative 2. No new authorized ("system") road construction is proposed. About 2.5 miles (6 segments) of road would be closed; effects on watershed would remain the same since the roadbed would be present. Haul would occur on 78 miles which would be maintained pre- and post-haul; maintenance is expected to alleviate drainage and gullying concerns on the roads previously described. About 4 miles of road (8 segments) would remain at the existing maintenance level but would have bike trails co-designate; bike use is not expected to change the effects of the roads. One road (1.2 miles) would be decommissioned and re-designated as a bike trail; the road surface would be narrowed and drainage installed, proportionately reducing its impact on watershed function. Undesignating bike trails from extending roads would have no effect on watershed function.

Roads would continue to intercept subsurface flow, concentrate overland flow and route sediment as described in the existing condition.

**Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws and valley bottoms)**

Activities proposed within RHCAs and MA 3B include aspen treatment, prescribed burning, road maintenance, recreation improvements at the developed campground, and construction and placement of fish sticks and cribs within Magone Lake. Effects of aspen and riparian road treatments and recreation improvements are discussed in subsections below.

Prescribed burning in RHCAs is not expected to expose mineral soil because it would be expected to burn with low intensity as described in the design elements listed in chapters 1 and 2. Low intensity fire is not expected to consume fully organic matter on the soil surface. Low intensity fire is not expected to burn wetter riparian vegetation; it would be likely to die out in the inner RHCAs. Consequently prescribed burning is not expected to contribute to watershed hazard or to detrimentally affect stream or riparian conditions. Fuel loads in RHCAs where prescribed fire would not be used would remain high and would be similar to those described for alternative 1 and may result in high-severity burns locally under wildfire conditions.

The proposed activities discussed above, combined with the fuel treatments proposed for the hillslopes, would develop landscape context for restoring resilient riparian communities and would promote the initial stages of riparian recovery.

Trees used for fish sticks and fish cribs would be felled and moved over snow; ground disturbance is not expected. Placement would occur while Magone Lake was iced over with the structures sinking as the ice melted.

Constructing new biking and hiking trail approaches to and crossings of streams using the project design criteria, including placement of slash below trails, waterbarring and hardening or bridging crossings is expected to control sediment and overland flow. Similarly, applying erosion control design criteria such as slash placement and waterbarring on all trails and limiting traffic to hiking on the Magone Slide and the North Connector trails within or immediately adjacent to the Magone Lake recreation area is expected to control sediment and overland flow.

**Aspen**: Project design criteria would control sediment generated during tree removal. See Silviculture Report.

**Riparian Roads**: Dust generated during haul would be controlled with applications of water or rocking of fish-bearing stream crossing or nearby perennial stream crossings. Pre- and post-haul maintenance would alleviate erosion, gullying or concentrating of flows on road segments in RHCAs described in the existing condition.

**Management Area 12 (Developed Recreation Area) and Management Area 8 (Special Interest Area) – Magone Geological Area at Magone Lake**: Implementation of project design criteria, including erosion control, is expected to control sediment and overland flow during construction of and during the life of improvements proposed for the boat moorings, east-side fishing dock, and at the proposed handicapped accessible trail.

**Magone Lake**: The addition of fish sticks and cribs, and their gradual decay over time, is not expected to adversely affect levels of dissolved oxygen in Magone Lake because it is a deep, cold water lake that is frozen about half the year, conditions under which dissolved oxygen is not expected to be a limiting factor. Controlling fish stocking would also limit effects on dissolved oxygen.

### Stream Channels (and Ephemeral Draws)

Project design criteria would control sediment and overland flow at trail crossings. Infiltration in ephemeral draws would remain as described in the existing condition since they would be protected from yarding.

### Water Quantity, Timing, Hydrologic Response, and Ground Water

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. Consequently, changes in timing and quantity of runoff are not expected.

**Ground Water**: Recharge of ground water would continue as described for the existing condition because ephemeral draws would be protected from yarding.

### Water Quality

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. The construction and maintenance of trail crossings and recreation improvements at Magone Lake are not expected to increase solar radiation to streams or the lake a measurable amount. Trees for fish sticks and cribs would not be removed from the primary shade zone along Magone Lake. Other proposed activities occur outside RHCAs and would not affect shade or other parameters that control temperature, biocriteria in streams, or other water quality indicators. The proposed activities are consistent with the Oregon Department of Environmental Quality's John Day River Basin Total Maximum Daily Load and Water Quality Management Plan and the Forest Service's Water Quality Restoration Plan for these reasons.

### Nipple Butte Inventoried Roadless Area

Several of the activities (juniper and other conifer encroachment felling and scattering of woody material, prescribed burning, and trail construction) previously discussed would also occur in the Nipple Butte Inventoried Roadless Area. Scattering coarse woody material associated with the juniper and conifer felling and the trail construction would promote infiltration and slow overland flow. Hardened or bridged trail crossings and waterbarring would control sediment and overland flow along trails. A layer of duff that would allow infiltration would remain after burning.

### Watershed Hazard

Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events which is the mechanism of concern on the soils and under the climate of the project planning area. As described in the Hillslope section, trails will intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase to Medium High at year 1, and gradually over several decades decline to Medium (plus) because the trails would still be present on non-forest soils.

### *Cumulative Effects*

The temporal and spatial boundaries were defined in the cumulative effects section near the beginning of environmental consequences. The foreseeable activities that are authorized under the Aquatic Restoration Decision—ranging from culvert replacements, large and coarse woody debris placement in streams and draws and on scabs, and installation of beaver support structures—are expected to improve riparian vegetation, floodplain function, stream channel function, rates and timing of runoff, and water quality in complement to the activities included in this analysis. Improving watershed condition, function, and processes or "capturing, storing and safely releasing runoff" would reduce watershed hazard to Medium at year 1 and move toward Medium Low over 1 to 3 decades as the aquatic treatments became fully effective and legacy disturbance and disturbance associated with the proposed harvest and selected activities recovered. Grazing to Forest Plan standards, as amended, is expected to result in improving riparian conditions that would complement the reduction in watershed hazard.

## 3.7.2.5 Alternative 3

### *Direct and Indirect Effects*

**Hillslopes (including ephemeral swales)**

Effects are discussed at year 1, year 5, and year 10 and for several decades. Year 1 was chosen because exposure of mineral soil and other ground disturbance is likely to be greatest at that point. The assumption is made for this analysis that most harvest and temporary road activities would occur in year 1. Year 5 was chosen because of the likelihood that effective ground cover would have become reestablished on disturbed areas, as described in the Soils Report. Year 10 was chosen because decompaction of affected areas would have been initiated by natural processes. Decompaction and other impacts may take several decades to recover. Table 63, Table 64, and Table 65 display the proposed activities by yarding system and subwatershed.

The most likely effect on overall watershed functioning from yarding and landing on hillslopes and ephemeral swales under alternative 3 is little or no change when individual units are considered, compared to alternative 1, because BMPs (seeWatershed report Appendix WS-G) and PDCs (see DEIS Appendix C) associated with the proposed activities are expected to control runoff and sediment transport under common runoff events. BMPs and project design criteria were designated for more sensitive soils such as the shallower Clarno soils or shallow, forested Clarno soils that are in association with non-forested soils (see Soil Report). Similarly BMPs associated with the proposed activities are expected to control runoff and sediment transport in the units where biomass harvesting is proposed, which may be in addition to those summarized in the tables. When the sum of the proposed units and their distribution across the landscape is considered, the additional disturbance raises the watershed hazard proportionately (discussed below) compared to alternative 1.

Effects related sediment and overland flow in each unit are expected to be similar to those described for alternative 2, based on the Soil Report.

Initially Watershed Best Management Practices, including site-specific project design criteria would be expected to control erosion and concentration of overland flow on 49 segments of temporary road (13.3 miles) for one to several years. They would not be restored to productivity for up to three decades after use. Re-establishment of ground cover would control sediment and runoff until productivity was restored.

As described for alternative 2, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including extensive roading outside the Nipple Butte Inventoried Roadless Area, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions and, possibly, extend the drainage network headward or create concentrations of runoff or sediment that could be transported beyond unit boundaries. This vulnerability is greater on the portions of units where tractor yarding is proposed on residual soils derived from breccias and tuffs in both subwatersheds as described for alternative 2.

These conditions would contribute to elevation of watershed hazard as discussed below. The extended drainage network would also increase watershed hazard associated with future rare runoff events; these effects are discussed in the Watershed Hazard section below.

Retaining limbs and boles from juniper thinning and thinning of other conifers encroaching on shallow soils or filling in open woodlands would promote recovery of watershed function in these areas by slowing overland flow and enhancing infiltration. Live ground cover would be expected to increase after about 5 years.

About 92 miles (25 segments) of biking and hiking trails would be constructed or designated as described for alternative 3. Adhering to project design criteria during construction is expected to control sediment and overland flow. Application of project design criteria would control sediment and overland flow at newly developed trailheads.

**Hillslope Roads**: Few changes in hillslope roads are proposed under alternative 2. No new authorized (“system”) road construction is proposed. About 2.5 miles (6 segments) of road would be closed; effects on watershed would remain the same since the roadbed would be present. Haul would occur on 98 miles which would be maintained pre- and post-haul; maintenance is expected to alleviate drainage and gullying concerns on the roads previously described. About 10 miles of road (9 segments) would remain at the existing maintenance level but would have bike trails co-designated; bike use is not expected to change the effects of the roads. One road (1.2 miles) would be decommissioned and re-designated as a bike trail; the road surface would be narrowed and drainage installed, proportionately reducing its impact on watershed function. Undesignating bike trails from extending roads would have no effect on watershed function.

Roads would continue to intercept subsurface flow, concentrate overland flow and route sediment as described in the existing condition.

**Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws and valley bottoms)**

Activities proposed within RHCAs and MA 3B include aspen treatment, prescribed burning, road maintenance, recreation improvements at the developed campground, and construction and placement of fish sticks and cribs within Magone Lake. Effects of aspen and riparian road treatments and recreation improvements are discussed in subsections below.

Prescribed burning in RHCAs is not expected to expose mineral soil because it would be expected to burn with low intensity as described in the design elements listed in chapters 1 and 2. Low intensity fire is not expected to consume fully organic matter on the soil surface. Low intensity fire is not expected to burn wetter riparian vegetation; it would be likely to die out in the inner RHCAs. Consequently prescribed burning is not expected to contribute to watershed hazard or to detrimentally affect stream or riparian conditions.

Fuel loads in RHCAs where prescribed fire would not be used would remain high and would be similar to those described for Alternative 1 and may result in high-severity burns locally under wildfire conditions.

As described for alternative 2 the proposed activities in combination would develop landscape context for restoring resilient riparian communities and would promote the initial stages of riparian recovery.

Trees used for fish sticks and fish cribs would be felled and moved over snow; ground disturbance is not expected. Placement would occur while Magone Lake was iced over with the structures sinking as the ice melted.

Constructing new biking and hiking trail approaches to and crossings of streams using the project design criteria, including placement of slash below trails, waterbarring and hardening or bridging crossings is expected to control sediment and overland flow. Similarly, applying erosion control design criteria such as slash placement and waterbarring on all trails and limiting traffic to hiking on the Magone Slide and the North Connector trails within or immediately adjacent to the Magone Lake recreation area is expected to control sediment and overland flow.

**Aspen**: Project design criteria would control sediment generated during tree removal. See Silviculture Report.

**Riparian Roads**: Dust generated during haul would be controlled with applications of water or rocking of fish-bearing stream crossing or nearby perennial stream crossings. Pre- and post-haul maintenance would alleviate erosion, gullying or concentrating of flows on road segments in RHCAs described in the existing condition.

**Management Area 12 (Developed Recreation Area) and Management Area 8 (Special Interest Area) – Magone Geological Area at Magone Lake**: Implementation of project design criteria, including erosion control, is expected to control sediment and overland flow during construction of and during the life of improvements proposed for the boat moorings, the east-side fishing dock, and at the proposed handicapped accessible trail.

**Magone Lake**: The addition of fish sticks and cribs, and their gradual decay over time, is not expected to adversely affect levels of dissolved oxygen in Magone Lake because it is a deep, cold water lake that is frozen about half the year, conditions under which dissolved oxygen is not expected to be a limiting factor. Controlling fish stocking would also limit effects on dissolved oxygen.

**Stream Channels (and Ephemeral Draws)**

Project design criteria would control sediment and overland flow at trail crossings. Infiltration in ephemeral draws would remain as described in the existing condition since they would be protected from yarding.

**Water Quantity, Timing, Hydrologic Response, and Ground Water**

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. Consequently, changes in timing and quantity of runoff are not expected.

**Ground Water**: Recharge of ground water would continue as described for the existing condition because ephemeral draws would be protected from yarding.

**Water Quality**

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. The construction and maintenance of trail crossings and recreation improvements at Magone Lake are not expected to increase solar radiation to streams or the lake a measurable amount. Trees for fish sticks and cribs would not be removed from the primary shade zone along Magone Lake. Other proposed activities occur outside RHCAs and would not affect shade or other parameters that control temperature, biocriteria in streams, or other water quality indicators. The proposed activities are consistent with the Oregon Department of Environmental Quality's John Day River Basin Total Maximum Daily Load and Water Quality Management Plan and the Forest Service's Water Quality Restoration Plan for these reasons.

**Nipple Butte Inventoried Roadless Area**

The effects of the proposed activities on watershed function would be the same as those described for alternative 2.

**Watershed Hazard**

Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events which is the mechanism of concern on the soils and under the climate of the project planning area. As described in the Hillslope section, trails will intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase to Medium High (plus) at year 1 because of the increase in yarding and new trail construction compared to alternative 2, and gradually over several decades decline to Medium (plus-plus) because the additional trails, some of which are on non-forest soils, would remain.

### *Cumulative Effects*

The temporal and spatial boundaries were defined in the cumulative effects section near the beginning of environmental consequences. The foreseeable activities that are authorized under the Aquatic Restoration Decision—ranging from culvert replacements, to large and coarse woody debris placement in streams and draws and on scabs, and installation of beaver support structures—are expected to improve riparian vegetation, floodplain function, stream channel function, rates and timing of runoff, and water quality in complement to the activities included in this analysis. Improving watershed condition, function, and processes or "capturing, storing and safely releasing runoff" would reduce watershed hazard to Medium (plus) at year 1 and move toward Medium Low (plus) over 1 to 3 decades as the aquatic treatments became fully effective and legacy disturbance and disturbance associated with the proposed harvest and selected activities recovered. Grazing to Forest Plan standards, as amended, is expected to result in improving riparian conditions that would complement the reduction in watershed hazard. The hazard would be elevated slightly because of the increased bike trails on sensitive soils.

### 3.7.2.6 Alternative 4

*Direct and Indirect Effects*

**Hillslopes (including ephemeral swales)**

Effects are discussed at year 1, year 5, and year 10 and for several decades. Year 1 was chosen because exposure of mineral soil and other ground disturbance is likely to be greatest at that point. The assumption is made for this analysis that most harvest and temporary road activities would occur in year 1. Year 5 was chosen because of the likelihood that effective ground cover would have become reestablished on disturbed areas, as described in the Soils Report. Year 10 was chosen because decompaction of affected areas would have been initiated by natural processes. Decompaction and other impacts may take several decades to recover. Table 63, Table 64, and Table 65display the proposed activities by yarding system and subwatershed.

The most likely effect on overall watershed functioning from yarding and landing on hillslopes and ephemeral swales under alternative 4 is little or no change when individual units are considered, compared to alternative 1, because BMPs (see Watershed report Appendix WS-G) and PDCs (see DEIS Appendix C) associated with the proposed activities are expected to control runoff and sediment transport under common runoff events. BMPs and project design criteria were designated for more sensitive soils such as the shallower Clarno soils or shallow, forested Clarno soils that are in association with non-forested soils (see Soil Report). Similarly BMPs associated with the proposed activities are expected to control runoff and sediment transport in the units where biomass harvesting is proposed, which may be in addition to those summarized in the tables. When the sum of the proposed units and their distribution across the landscape is considered, the additional disturbance raises the watershed hazard proportionately (discussed below) compared to alternative 1.

Effects related sediment and overland flow in each unit are expected to be similar to those described for alternative 2, based on the Soil Report.

Initially Watershed Best Management Practices, including site-specific project design criteria would be expected to control erosion and concentration of overland flow on 31 segments of temporary road (11.9 miles) for one to several years. They would not be restored to productivity for up to three decades after use. Re-establishment of ground cover would control sediment and runoff until productivity was restored.

As described for alternative 2, because the proposed activities would be implemented in sub-drainages which have been previously disturbed by management activities, including extensive roading outside the Nipple Butte Inventoried Roadless Area, a slight probability exists that previous disturbance would become connected to ground disturbance associated with the proposed actions and, possibly, extend the drainage network headward or create concentrations of runoff or sediment that could be transported beyond unit boundaries. This vulnerability is greater on the portions of units where tractor yarding is proposed on residual soils derived from breccias and tuffs in both subwatersheds as described for alternative 2.

These conditions would contribute to elevation of watershed hazard as discussed below. The extended drainage network would also increase watershed hazard associated with future rare runoff events; these effects are discussed in the Watershed Hazard section below.

About 11.9 miles (7 segments) of biking and hiking trails would be constructed or designated as described for alternative 4. Adhering to project design criteria during construction is expected to control sediment and overland flow. Application of project design criteria would control sediment and overland flow at newly developed trailheads.

**Hillslope Roads**: Few changes in hillslope roads are proposed under alternative 4. No new authorized ("system") road construction is proposed. About 2.5 miles (6 segments) of road would be closed; effects on watershed would remain the same since the roadbed would be present. Haul would occur on about 77 miles which would be maintained pre- and post-haul; maintenance is expected to alleviate drainage and gullying concerns on the roads previously described. About 1 mile of road (2 segments) would remain at the existing maintenance level but would have bike trails co-designated; bike use is not expected to change the effects of the roads. One road (1.2 miles) would be decommissioned and re-designated as a bike trail; the road surface would be narrowed and drainage installed, proportionately reducing its impact on watershed function. Undesignating bike trails from extending roads would have no effect on watershed function.

Roads would continue to intercept subsurface flow, concentrate overland flow and route sediment as described in the existing condition.

Riparian Habitat Conservation Areas (RHCAs) and Management Area 3B (MA 3B) (including wet areas, ephemeral draws and valley bottoms)

Activities proposed within RHCAs and MA 3B include aspen treatment, prescribed burning, road maintenance, recreation improvements at the developed campground, and construction and placement of fish sticks and cribs using material up to 20 inches in diameter removed from the RHCA on the east side of Magone Lake. Effects of aspen and riparian road treatments and recreation improvements are discussed in subsections below.

Prescribed burning in RHCAs is not expected to expose mineral soil because it would be expected to burn with low intensity as described in the design elements listed in chapters 1 and 2. Low intensity fire is not expected to consume fully organic matter on the soil surface. Low intensity fire is not expected to burn wetter riparian vegetation; it would be likely to die out in the inner RHCAs. Consequently, prescribed burning is not expected to contribute to watershed hazard or to detrimentally affect stream or riparian conditions. Fuel loads in RHCAs where prescribed fire would not be used would remain high and would be similar to those described for alternative 1 and may result in high-severity burns locally under wildfire conditions.

As described for alternative 2 the proposed activities in combination would develop landscape context for restoring resilient riparian communities and would promote the initial stages of riparian recovery.

Trees used for fish sticks and fish cribs would be felled and moved over snow; ground disturbance is not expected. Placement would occur while Magone Lake was iced over with the structures sinking as the ice melted.

Constructing new biking and hiking trail approaches to and crossings of streams using the project design criteria, including placement of slash below trails, waterbarring and hardening or bridging crossings is expected to control sediment and overland flow. Similarly, applying erosion control design criteria such as slash placement and waterbarring on all trails and limiting traffic to hiking on the Magone Slide and the North Connector trails within or immediately adjacent to the Magone Lake recreation area is expected to control sediment and overland flow. However, because the number of trails and crossings are reduced in this alternative, the amount of watershed hazard associated with trail construction is reduced proportionately.

**Aspen**: Project design criteria would control sediment generated during tree removal. See Silviculture Report.

**Riparian Roads**: Dust generated during haul would be controlled with applications of water or rocking of fish-bearing stream crossing or nearby perennial stream crossings. Pre- and post-haul maintenance would alleviate erosion, gullying or concentrating of flows on road segments in RHCAs described in the existing condition.

**Management Area 12 Developed Recreation Area and Management Area 8 Special Interest Area – Magone Geological Area at Magone Lake**: Implementation of project design criteria, including erosion control, is expected to control sediment and overland flow during construction of and during the life of improvements proposed for the boat moorings.

**Magone Lake**: The addition of fish sticks and cribs, and their gradual decay over time, is not expected to adversely affect levels of dissolved oxygen in Magone Lake because it is a deep, cold water lake that is frozen about half the year, conditions under which dissolved oxygen is not expected to be a limiting factor. Controlling fish stocking would also limit effects on dissolved oxygen.

### Stream Channels (and Ephemeral Draws)

Project design criteria would control sediment and overland flow at trail crossings. Ephemeral draws would continue to function as described for alternative 2. Infiltration in ephemeral draws would remain as described in the existing condition since they would be protected from yarding.

### Water Quantity, Timing, Hydrologic Response, and Ground Water

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. Consequently, changes in timing and quantity of runoff are not expected.

**Ground Water**: Recharge of ground water would continue as described for the existing condition because ephemeral draws would be protected from yarding.

### Water Quality

The application of Watershed Best Management Practices and the associated site-specific project design criteria are expected to control sediment and overland flow. The construction and maintenance of trail crossings and recreation improvements at Magone Lake are not expected to increase solar radiation to streams or the lake a measurable amount. Trees for fish sticks and cribs would not be removed from the primary shade zone along Magone Lake. Other proposed activities occur outside RHCAs and would not affect shade or other parameters that control temperature, biocriteria in streams, or other water quality indicators.

The proposed activities are consistent with the Oregon Department of Environmental Quality's John Day River Basin Total Maximum Daily Load and Water Quality Management Plan and the Forest Service's Water Quality Restoration Plan for these reasons.

**Nipple Butte Inventoried Roadless Area**

The effects of the proposed activities on watershed function would be the same as those described for alternative 2.

**Watershed Hazard**

Although the proposed activities are consistent with the Clean Water Act requirements, the additional disturbance and exposure of mineral soil associated with yarding, temporary roads, and construction and maintenance of new trails provides additional opportunities for runoff to be collected, concentrated and re-routed under rare events which is the mechanism of concern on the soils and under the climate of the project planning area. As described in the Hillslope section, trails will intersect with yarding trails and temporary roads, increasing potential for connections. However, road maintenance, especially of eroding roads or roads that are acting as collectors of overland flow would reduce the potential for connections. Watershed hazard is expected to increase to Medium High (minus) at year 1 because of the increase in yarding and new trail construction compared to alternative 2, and gradually over several decades decline to Medium (minus) because fewer additional trails, some of which are on non-forest soils, would be implemented.

*Cumulative Effects*

The temporal and spatial boundaries were defined in the cumulative effects section near the beginning of environmental consequences. The foreseeable activities that are authorized under the Aquatic Restoration Decision—ranging from culvert replacements, large and coarse woody debris placement in streams and draws and on scabs, and installation of beaver support structures—are expected to improve riparian vegetation, floodplain function, stream channel function, rates and timing of runoff, and water quality in complement to the activities included in this analysis. Improving watershed condition, function, and processes or "capturing, storing and safely releasing runoff" would increase watershed hazard just slightly above Medium at year 1 due to the increase in aquatic rehabilitation activities compared to fewer ground disturbing activities than under other action alternatives. Watershed hazard would move toward Medium Low over 1 to 3 decades as the aquatic treatments became fully effective and legacy disturbance and disturbance associated with the proposed harvest and selected activities recovered. Grazing to Forest Plan standards, as amended, is expected to result in improving riparian conditions that would complement the reduction in watershed hazard. The hazard would be decreased slightly because of the reduction in bike trails on sensitive soils.

### 3.7.2.7 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

*Malheur Forest Plan*

The Malheur Forest Plan provides direction to protect or enhance riparian-dependent resources in watersheds supporting non-anadromous fish, and to protect habitat and populations of non-anadromous fish (MA 3A, Chapter IV, pages 55-61; Amendment 29; PACFISH; Inland Native Fish Strategy for watersheds in Eastern Oregon and Washington, Idaho, and portions of California [INFISH]). INFISH identifies riparian habitat conservation areas (RHCAs), riparian management objectives, and standards and guidelines for activities in RHCAs.

Standards contained in Malheur Forest Plan Amendment 29, considered to be more restrictive than those in INFISH, supersede comparable standards in INFISH. A more detailed description of regulations related to this Watershed Report is included in Appendix 2.

*Clean Water Act*

The Federal Water Pollution Control Act of 1972 (Public Law 92-500, also known as the Clean Water Act) and ensuing regulations form the foundation for environmental analysis for the watershed and hydrology resource. The main objective of the Clean Water Act is to “restore and maintain the chemical, physical, and biological integrity of the Nation's waters” (CWA Section 101 (a)). The Forest Service is directed to “Comply with State requirements in accordance with the Clean Water Act for protection of waters in the State of Oregon (see Oregon Administrative Rules, Chapter 34041) through planning, application and monitoring of best management practices (BMPs) in conformance with Clean Water Act, regulations, and Federal guidance issued thereto” (Land and Resource Management Plan, Malheur National Forest, Standard 117, Chapter IV, page 39).

The Malheur Forest Plan provides direction to protect and manage water resources through compliance with State requirements described in a 2014 Memorandum of Understanding (MOU) that are in accordance of the Clean Water Act. The MOU states that the Forest Service cannot further degrade water quality impaired streams through management activities. The MOU recognizes that BMPs are the primary means to control non-point source pollution on National Forest lands. Adherence to BMPs provides adequate protection and avoids significant effects to listed impaired streams within the project area or its influence.

## 3.8 Analysis Issue – Aquatic Species

This section contains an analysis of existing and desired aquatic habitat conditions in the Magone Project analysis area and contains an analysis of effects from proposed activities on aquatic threatened, endangered, and Region 6 sensitive (TES) species, Malheur Forest Plan aquatic management indicator species, and aquatic habitat.

### 3.8.1 Existing Condition

For over 100 years, lands within the project planning area have been subjected to a variety of land-use activities. Practices included past silvicultural treatments, homesteading, beaver trapping, fire suppression, prescribed fire, road construction, and livestock and sheep grazing on public and private land, in addition to wildfire suppression throughout the landscape. These activities have reduced aquatic species habitat quality and complexity and altered stream processes within the project planning area. Past logging, livestock grazing, and road construction in the riparian areas have reduced canopy cover in some areas, resulting in less shade over streams in the form of riparian hardwoods, especially within wide valley bottoms.

Roads in the project planning area that occur within 100 feet of a stream floodplain and or intercept upland water conveyance or cross a stream commonly impact fish and fish habitat more than roads located in uplands. A high percentage of roads in riparian habitat conservation areas in the project planning area are native surface roads that adversely affect aquatic habitat by contributing fine sediment to streams, altering hydrology and sediment transport, and a reduction in wood loadings (Meredith et al. 2014). Total open and closed road densities are approximately 2.6 miles per square mile. There are approximately 23 miles of roads in the project planning area that impact streams due to proximity (100 feet or less); these conditions reduce availability of subsurface cool water storage and cause streams to become disconnected from floodplains.

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. Within the project planning area, poorly designed crossings are primarily located on alluvial fans, including Clear Creek, Thompson Creek, Lake Creek, and Tinker Creek and their confluence with East Fork Beech Creek, as well as two locations on East Fork Beech Creek. These road crossings are adversely impacting width-to-depth ratio, sediment storage and conveyance, and pool formation for the primary habitat elements (see description below). Fine sediment is also a concern from roads that are hydrologically connected to disturbed areas. In the case of East Fork Beech Creek, and the lowermost sections of Clear Creek, Thompson Creek, and Tinker Creek, much of the wood that was historically present was systematically removed over the years for flood protection of the road and its infrastructure, as well as protection of outbuildings or homesteads that may have been located in the floodplain.

Past grazing management practices (prior to the 1990 Malheur Forest Plan) impacted existing aquatic habitat and water quality due to reductions in shade, bank-stabilizing wetland vegetation, and riparian hardwood communities; stream bank alterations; and increases in width-to-depth ratios and fine sediment levels. These impacts were exacerbated within areas that had been disturbed by logging. Improved management practices, on both private and Forest Service land, have resulted in improved aquatic conditions to an extent; however, riparian hardwood vegetation, stream channel morphology, and large woody debris are still in a degraded condition within the majority of the project planning area.

Recreation has also impacted streams due to road development providing increased access to the project planning area for hunting, fishing, hiking, firewood cutting, and dispersed camping. In the fall, deer and elk hunting are popular recreation activities within much of the project planning area. Dispersed campsites have impacts to aquatic habitat and use of these sites varies throughout the year, with the majority of sites showing heaviest use during the fall hunting season.

Homesteading began in the area during the 1880s and often occurred in areas with wide valley bottoms for pasture creation and hay production for livestock. Surrounding timber was often cleared and used for building materials on the homesteads. Trees within the flat bottom valleys were the most readily available material and often the first to be harvested.

There are no active mine claims in the project planning area nor have any historical records regarding mining been identified. Geology within the project planning area is not conducive to gold mining or dredging.

#### 3.8.1.1 Primary Habitat Elements

Important aquatic habitat elements as defined by PACFISH and Forest Plan Amendment 29 include: 1) pool frequency, 2) water temperature and stream shading, 3) large woody debris, 4) embeddedness and fine sediment, 5) width-to-depth ratio, and 6) bank stability. These habitat elements are important in maintaining aquatic habitat function and health and are linked to physical and biological processes within the watershed.

### *Pool Frequency*

Pool frequency and depth is a gauge of stream physical processes, stream energy dynamics, streambed form, aquatic habitat diversity, and stream channel complexity. Pool frequency and depth is also an indicator of the degree to which streams are capable of supporting a varied and complex community of fish species and dissipating stream energy. Pools are important rearing habitat for juvenile fish during high flow events and provide cool-water refuge areas for adult fish during periods of low flow and elevated temperatures. Deep pools provide important habitat for adult and juvenile steelhead, westslope cutthroat trout, and redband trout amongst other native fish species. Stream surveys indicate that pool frequency objectives are not being met within all the stream reaches in the project planning area (Table 66).

**Table 66. Existing condition from most recent Region 6 stream surveys for six primary habitat elements used for comparison of alternatives**

| Stream name | Survey year | Pool frequency | Water temperature | | Large woody debris | Fine sediment/ embeddedness | Width-to-depth ratio | Bank stability |
|---|---|---|---|---|---|---|---|---|
| | | | 7-day mean maximum | Shade | | | | |
| Clear Creek Reach 1 | 2014 | 32.5 | 67.57 °F (6/11-7/8) | **72.85** | 7.8 | 25.5% < 2mm | 23.5 | **99** |
| Clear Creek Reach 2 | 2014 | 27 | | **85** | 46.7 | 35% < 2mm | 18.6 | **97** |
| Clear Creek Reach 4 | 2014 | 21.7 | | **87.5** | 64.7 | 31% < 2mm | 24.0 | **99** |
| Clear Creek Reach 5 | 2014 | 19.3 | | **73.5** | 20 | 30.5% < 2mm | 27.9 | **97** |
| Clear Creek Reach 7 | 2014 | 13.6 | | **96** | 23.4 | 27.5% < 2mm | 64.2 | **100** |
| Clear Creek Reach 8 | 2014 | 11.7 | | **66** | 18.6 | 40.5% < 2mm | 14.1 | **99** |
| Clear Creek Reach 9 | 2014 | 0 | | **-** | 16 | 31% < 2mm | 13.1 | **97** |
| EF Beech Creek Reach 1 | 2014 | 55.6 | 66.27 °F (6/11-10/5) | **71.0** | 10.4 | 22% < 2mm | 26.1 | **97** |
| EF Beech Creek Reach 3 | 2014 | 42.5 | | **65.0** | 5.1 | **13% < 2mm** | 27.5 | **95** |
| EF Beech Creek Reach 5 | 2014 | 42.0 | | **63.5** | 4.1 | 39% < 2mm | 24.3 | **97** |
| EF Beech Creek Reach 7 | 2014 | 31.6 | | **85.0** | 3.7 | 49.5% < 2mm | 18.8 | **99** |
| EF Beech Creek Reach 8 | 2014 | 14.3 | | **67.5** | 0.0 | 23% < 2mm | 19.1 | **99** |
| EF Beech Creek Reach 9 | 2014 | 3.3 | | **67.5** | 23 | - | 38.5 | **100** |
| EF Beech Creek Reach 10 | 2014 | 1.5 | | **64** | 12 | - | 22.6 | **100** |
| EF Beech Creek Reach 11 | 2014 | 12 | | **50.5** | 9 | - | 36.6 | **100** |
| McClellan Creek Reach 2 | 2014 | 34.9 | 67.23 °F (6/11-10/5) | **69.3** | 12.5 | **19% < 2mm** | 15.9 | **98** |
| McClellan Creek Reach 3 | 2014 | 51.1 | | **50.8** | 5.3 | 40.5% < 2mm | 17.6 | **95** |
| McClellan Creek Reach 4 | 2014 | 44.9 | | **81.1** | 52.8 | 29.5% < 2mm | 24.1 | **98** |
| McClellan Creek Reach 5 | 2014 | 17.8 | | **80.8** | 17.3 | 39.5% < 2mm | 22.7 | **96** |

| Stream name | Survey year | Pool frequency | Water temperature | | Large woody debris | Fine sediment/ embeddedness | Width-to-depth ratio | Bank stability |
|---|---|---|---|---|---|---|---|---|
| | | | 7-day mean maximum | Shade | | | | |
| Nipple Creek Reach 1 | 2014 | 1.9 | - | 29.25 | 28.4 | **19% < 2mm** | **9.33** | **99** |
| Tinker Creek Reach 1 | 2014 | 44 | **62.35 °F (6/11-10/5)** | **57** | 25 | 46.5% < 2mm | 15 | **98** |
| Tinker Creek Reach 2 | 2014 | 55 | | **71** | 28 | 73% < 2mm | 14 | **99** |
| Tinker Creek Reach 3 | 2014 | 27 | | **65.5** | 63 | 60.5% < 2mm | 13 | **99** |
| Tinker Creek Reach 4 | 2014 | 15 | | **84** | 33 | 49.5% < 2mm | 13 | **99** |
| Tinker Creek Reach 5 | 2014 | 4 | | **55** | 29 | 22.5% < 2mm | 13 | **99** |
| Thompson Creek Reach 1 | 2014 | 1.34 | 74.61 °F(6/11-10/8) | 43.5 | 2 | 19% <2mm | 19.5 | **99.85** |
| Grub Creek Reach 1 | 2014 | 22 | | 35.5 | 12 | 60.5%<2mm | 13.7 | **98** |
| Grub Creek Reach 2 | 2014 | 1.7 | 65.12 °F(6/11-10/5) | 45 | 9 | 54.5<2mm | **8.3** | **99** |

Note: Values in bold font are meeting fish habitat objectives.

Pool spacing is higher for reaches compared to potential channel types in the project planning area and there is an absence of quality pools (greater than 2 feet deep). This indicates a loss of pool habitat and general hydrological function as a result of past management activities related to livestock grazing, riparian logging, and channel modification during road building. In general, pool formation is controlled by geology, slope, substrate, channel type and condition, sediment transport, riparian vegetation, and instream and floodplain roughness (woody debris). Examples of some pool types in the project planning area are shown below (Figure 31, Figure 32, and Figure 33).

Pool frequency data for streams within the project planning area are summarized within Table 66 and the Aquatic Resources Report – Appendix A.

**Figure 31. Pool formed on Clear Creek by streambank vegetation ("cottonwood" and large rootwad from fallen tree) and outside bed scour.**

**Figure 32. Series of pools and side channels formed from downed wood (large and coarse wood) in Nipple Creek (within Nipple Butte IRA).**

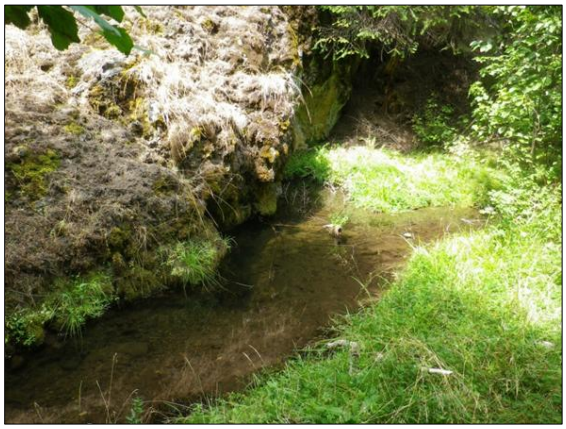

**Figure 33. Pool formed from rock outcrop (geological feature and outside bend scour). This pool is located within an intermediate depositional point caused by wood being pinned in a valley "pinch" point on a transport reach. McClellan Creek Reach 4 within Nipple Butte IRA.**

### *Water Temperature and Stream Shading*

Water temperature influences the metabolism, behavior, and health of fish and other aquatic organisms. Fish can survive at temperatures near extremes of suitable temperature ranges; however, growth is reduced at low temperatures because all metabolic processes are slowed. At the opposite extreme, growth is reduced at high temperatures because most or all energy from food must be used for maintenance needs. Juvenile fishes have a narrower thermal niche and lower tolerance for temperature fluctuations than do adults (Baroudy and Elliot 1994).

Mean maximum water temperatures are above the suitable range for salmonid species present during summer months in the project planning area in the following streams: Thompson Creek, Clear Creek, East Fork Beech Creek, McClellan Creek, and Grub Creek. This data may also be used to extrapolate water temperatures both downstream and upstream of temperature sites. The Malheur Forest Plan standard for water temperature is for no measurable increase in maximum water temperature, and the PACFISH riparian management objective (RMO) is for maximum water temperatures below 64 °F within migration and rearing habitat and below 60 °F within spawning habitats. The existing water temperature data is compared to these values within Table 66; see Table 67 for PACFISH RMOs and Malheur Forest Plan standards for fish habitat criteria. The average 7-day maximum stream temperature across the project planning area ranges from 62 to 68 °F (Table 66). Temperatures were taken from the lower stream reaches that typically have migration and spawning habitat. The temperature metrics by stream are summarized in Table 66 and the Watershed Report and section. Available water temperature data indicates that temperature objectives are being met in Tinker Creek but lower elevation reaches downstream are not meeting water temperature criteria.

**Table 67. PACFISH riparian management objectives (RMOs) and Malheur Forest Plan standards fish habitat criteria**

| Habitat feature | RMOs | Forest Plan Amendment 29 |
|---|---|---|
| Pool frequency<br>*Wetted width in feet*<br>*Number of pools per mile* | 10 20 25 50 75 100 125 150 200<br>96 56 47 26 23 18 14 12 9 | <10 >10-20 >20-25 >25-50<br>75-132 38-66 30-53 15-26 |
| Water temperature (all systems) | Compliance with state water quality standards, or maximum <68 $^{o}$F / 20 $^{o}$C | -- |
| Large woody debris (pieces per mile in forested systems) | East of Cascade Crest in Oregon, Washington, and Idaho, >20 pieces >12 inch diameter, >35 foot length | *Ponderosa pine ecosystem* – 20-70 pieces ≥12 inch diameter and 20% >20 inches in diameter and ≥35 feet long or 1.5 times bankfull width.<br>*Mixed conifer ecosystem* – 80-120 pieces ≥12 inch diameter and 20% >20 inches in diameter and ≥35 feet long or 1.5 times bankfull width.<br>*Lodgepole pine ecosystem* – 100-350 pieces ≥6 inch diameter and 10% >12 inches in diameter and ≥18 feet long or 1.5 times bankfull width. |
| Bank stability | >80% stable | >90% stable |
| Lower bank angle (undercut banks) non-forested system | >75% of banks with <90$^{o}$ angle | 50-75% undercut (with less than 2% gradient) |
| Wetted width/depth ratio | <10 (mean wetted width divided by depth) | <10 |
| Embeddedness | -- | ≤20 |
| Percent shade/canopy closure | -- | *Ponderosa Pine ecosystem* – 40-55%<br>*Mixed Conifer ecosystem* – 50-65%<br>*Lodgepole Pine ecosystem* – 60-75%<br>*Hardwood/meadow complexes* – 80% |

Riparian stream shading is critical in regulating water temperature extremes and providing in-stream cover against predation. Riparian vegetation can decrease water temperature, as much as 3 to 4 °C (37.4 to 39.2 °F) within 492 feet by reducing incoming solar radiation, as well as decrease air temperature (Johnson 2004). Additionally, streambed substrates play a role in diurnal water temperature fluctuations. Daily maximum temperatures were higher and minimum temperatures were lower in streambeds composed of bedrock (Johnson 2004). An example of a streambed scoured down to bedrock within the project planning area is provided below. Complex flow paths within alluvial streams (cobble/gravel) results in slow median water velocities, and therefore longer hydraulic retention times. These slow velocities led to mixing of daytime and nighttime water between and within the channel and hyporheic zone (Johnson 2004). Accumulations of large organic matter inputs (coarse wood/large wood) with fine material have an effect of increasing hydraulic retention times, which also mediates water temperature (Johnson 2004).

Vegetation along streams in the project planning area is highly variable and often contingent upon valley width and slope. Many of the streams within the inventoried roadless area (IRA) have stands of large trees with closed canopies stretching along the stream (Figure 34). Most streams have a patchy distribution of forest and non-forest, open vegetation types associated with widening of the valley floor (Figure 35 and Figure 36). The open valley types are characterized by flattening of stream channel slope and deposition of alluvium substrates or fine organic material. The presence of fine organic material on the floodplain is an indicator of some feature that creates a hydraulic dam within the stream that inundates the floodplain. The presence of stringer meadows in the project planning area (instead of forest vegetation) contributes to high stream temperatures only when riparian hardwood vegetation (Figure 36 and Figure 37) is inadequate or degraded and channel morphology is out of balance (over-widened) or floodplain connectivity is lost (incised channel), increasing solar radiation and decreasing groundwater exchange and recharge. Examples of vegetative primary shade elements and streambed substrate within the Magone project planning area based on valley type (wide or narrow) as well as an example of some recovery are depicted in Figure 34, Figure 35, Figure 36, Figure 37, and Figure 38.

Stream surveys indicate that shade objectives are not being met within the following stream reaches: Nipple Creek Reach 1, Thompson Creek Reach 1, and Grub Creek Reaches 1 and 2.

Stream surveys indicate that shade objectives are being met within the following stream reaches in the project planning area: Clear Creek Reaches 1–9, East Fork Beech Creek Reaches 1–11, McClellan Creek Reaches 2–5, Tinker Creek Reaches 1–3. The shade metrics by stream reach are summarized in **Error! Reference source not found.**.

**Figure 34. Example where primary shade is conifer overstory (narrow valley bottom). Clear Creek within Nipple Butte IRA.**

**Figure 35. Example where primary shade is alder (wide valley bottom). East Fork Beech Creek Reach 7.**

**Figure 36. Example where primary shade would normally be riparian hardwoods (wide valley bottom) with secondary conifer shading; however, conifers are currently primary shade providers followed by hawthorn. Clear Creek Reach 2 most sensitive riparian area (absence of riparian hardwoods).**

**Figure 37. Example of shrub recovery and channel recovery in progress from an over-widened channel. McClellan Creek Reach 2 most sensitive riparian area.**

**Figure 38. East Fork Beech Creek streambed scoured down to bedrock just above confluence of Clear Creek.**

### *Large Woody Debris*

Large woody debris (LWD) and coarse woody debris (CWD) play an important role in forested stream reaches and maintaining beaver created meadows (Burchsted 2010) by dissipating stream energy, trapping sediment (Figure 39), trapping riparian hardwood and hydric plant seeds, and providing suitable microclimates for seed germination (Osei et al. 2015). Woody debris provides stream grade stabilization (Figure 39 and Figure 40), initiates streambed aggradation and channel braiding, and forms pools (Polvi and Wohl 2013, Cluer and Thorne 2014), all of which increase habitat complexity. Riparian forests, especially individual trees that are within ½- to ¾-tree length of the stream channel, produce LWD and CWD that is recruited into a stream where it creates critical habitat features for aquatic species. These large pieces of wood are called "key" pieces that function by capturing smaller CWD and filling interstitial spaces within wood jams (Figure 40). Forest Plan Amendment 29 specifies a range in the number of pieces of LWD to be maintained for each mile of stream in certain ecotypes. Standards for LWD are located in Table 67 and the Aquatic Resources Report – Appendix A.

Timber adjacent to streams in the project planning area has been harvested for commercial value and during homesteading for local use as building material and firewood. In extreme cases, removal of floodplain timber coupled with livestock grazing and large increases in peak flows resulted in large increases in channel width, which quickly destabilized in-stream pieces of wood resulting in a decrease in LWD, filling of pools, and loss of floodplain connectivity. Stream surveys indicate that LWD objectives are not being met on all stream reaches within the project planning area (Figure 41). Those streams that are closest to meeting LWD objectives are within the upper reaches in the Nipple Butte IRA and do not have roads adjacent to them (Figure 40).

**Figure 39. Remnant pieces of large woody debris within Tinker Creek Reach 1. Notice deposition in front of wood greater than 1.5 feet high and surface water below.**

**Figure 40. Example of downed wood (large woody debris) capturing smaller pieces of wood (coarse woody debris), creating pools and increasing stream channel complexity. McClellan Creek within Nipple Butte IRA.**

**Figure 41. Example of the absence of downed wood within Tinker Creek Reach 1 adjacent to a Forest Service road (stream channel is dry).**

### *Embeddedness and Fine Sediment*

Composition of the stream substrate is an important feature of aquatic habitat. Cobble and gravel substrates provide habitat for macroinvertebrates as well asegg incubation and cover for early life stages of numerous fish species. Macroinvertebrates (both terrestrial and aquatic) represent a substantial portion of the diet available to fish. Filling of interstitial spaces (i.e., the gaps between rocks on the stream bottom) with fine sediment (particles less than 2 millimeters in size) eliminates habitat for many macroinvertebrates. Fish eggs, early life stages, and winter habitat for juvenile salmonids can also be buried and smothered when interstitial spaces are embedded with fine sediment.

Stream surveys indicate that substrate embeddedness and fine sediment objectives are not being met in Clear Creek Reaches 1–9; East Fork Beech Creek Reaches 1, 2, and 4–11; McClellan Creek Reaches 3, 4, and 5; Tinker Creek Reaches 1–5; and Grub Creek Reaches 1–2. Reaches that are meeting standards include East Fork Beech Creek Reach 3, Nipple Creek Reach 1, Thompson Creek Reach 1, and McClellan Creek Reach 2. East Fork Beech Creek Reach 3 is immediately below a series of beaver dams, Nipple Creek Reach 1 has a steep gradient, Thompson Creek Reach 1 is also steep, and McClellan Creek Reach 2 is a depositional reach. Fine sediment is expected to be higher in depositional areas and is often an indicator of features that have created dams within the stream channel and inundated floodplains. The likely sources for fine sediment are activities in riparian areas, extant beaver meadows which are currently incised, channel erosion, livestock grazing (especially past grazing), loss of streambank stabilizing riparian hardwoods and hydric sedge communities, and roads. Several roads in the project planning area are potential sources of fine sediment and are within the active floodplain or immediately upslope of the floodplain. These roads can capture/intercept upland water and modify the hydrological and sediment transport regime adjacent to these floodplains. Roads that are potential sources of fine sediment include Forest Service road (FSR) 3600 and 3620 and County Road 32 along East Fork Beech Creek and Tinker Creek.

### *Width-to-Depth Ratio*

Malheur Forest Plan standards for width-to-depth ratios are based on wetted width and depth. A large wetted width-to-depth ratio indicates a wide and shallow stream channel (Figure 42 and Figure 44). Wide and shallow streams are prone to increases in stream temperatures due to high surface area to volume ratio and provide little habitat for fish, due to the lack of water depth. This stage within the stream channel evolution model is associated with poor biological and physical habitat complexity (Cluer and Thorn 2014).

Stream surveys indicate that objectives for wetted width-to-depth ratios are met in Nipple Creek Reach 1 and Grub Creek Reach 2. Examples of areas where width-to-depth ratios were met or closely meeting standards in the Magone project planning area are provided in Figure 45, Figure 46, and Figure 47.

Clear Creek Reaches 1–9, East Fork Beech Creek Reaches 1–11, McClellan Creek Reaches 2–5, Tinker Creek Reaches 1–5, Thompson Creek Reach 1, and Grub Creek Reach 1 are not meeting objectives for wetted width-to-depth ratios. FSR 3600 and County Road 32 are immediately adjacent to East Fork Beech Creek along its entire length and the roads cross the alluvial fans of each tributary that enters from the north side of East Fork Beech Creek (Figure 43). Tinker Creek has FSR 3620 immediately adjacent to it for 2 miles at its confluence with East Fork Beech Creek. This has resulted in focused flows within the stream channel of the tributaries entering East Fork Beech Creek and over-widening/incision of the stream channel.

The presence of these roads immediately upslope of East Fork Beech Creek and Tinker Creek has altered the hydrology resulting in interception of over-land flows from uplands and concentrates this water; concentration of this water in ditches and smaller streams results in degraded channel structure when the appropriate vegetation is not present.

**Figure 42. General characteristics of an over-widened straightened channel and minimal riparian vegetation. Clear Creek Reach 1.**

**Figure 43. Legacy berms along Clear Creek near county road.**

**Figure 44. Example of a wide valley bottom with an over-widened stream channel and minimal shade. Clear Creek Reach 2.**

**Figure 45. Example of near desired condition for channel width based on valley form. Clear Creek Reach 6.**

**Figure 46. Example of near desired condition for channel width based on valley form. Tinker Creek Reach 4.**

**Figure 47. Example of near desired condition for channel width based on valley form and well-developed sedge community.**

### *Bank Stability*

Channel types differ in their sensitivity to management activities due to differences in bank erosion potential and the influence of streamside vegetation on bank stability. Stream surveys indicate that bank stability objectives are being met on all stream reaches in the project planning area. However the lack of well defined streambanks within East Fork Beech Creek and lower sections of Clear Creek, Thompson Creek, and Tinker Creek along with a stream bed dominated by cobble indicates additional factors are inhibiting stream bank formation related to altered hydrology.

### *Existing Condition Compared to Desired Condition*

Fish habitat in the analysis area generally does not meet Malheur Forest Plan desired future conditions (DFCs) and riparian management objectives (RMOs) for pool frequency, large woody debris (LWD), sediment, temperature, and width-to-depth ratio (Table 67). The condition of important habitat elements including low pool frequency, high water temperatures, reduced LWD frequency, high fine sediment levels, and moderately high width-to-depth ratios indicate reduced fish habitat quality as a result of past management activities. Although bank stability does meet the RMOs in general, specific locations where bank instability is occurring are not in the appropriate locations. Areas of bank instability often occur on the outside banks of stream meanders. Many of the streams, in particular East Fork Beech Creek, have eroded down to the stream armor layer with limited or no stream banks present. Where stream channels have been straightened, bank instability is occurring on both sides of the stream channel (mostly related to roads and removal of LWD) due to excessive stream energy and lack of energy dissipation in the form of LWD, sinuosity, and floodplain roughness. Most streams in the analysis area are in a highly altered state, with conditions of important habitat elements strongly limiting quality of fish habitat.

Additional metrics based on Amendment 29 DFCs, PACFISH RMOs, and the National Marine Fisheries Service/U.S. Fish and Wildlife Service Matrix of Pathways and Indicators are included within the Aquatic Resources Report – Appendix A.

## 3.8.1.2 Aquatic Species

### *Threatened, Endangered, and Sensitive Species*

An endangered species is an animal or plant species listed under the Endangered Species Act (ESA) as being in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the ESA as likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

A sensitive species is an animal or plant species identified by the Regional Forester for which species viability is a concern either 1) because of current or predicted downward trend in population numbers or density, or 2) because of current or predicted downward trends in habitat capability that would reduce a species' existing distribution (R6 sensitive).

### *Management Indicator Species*

Management indicator species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate effects of land management activities. Through the MIS concept, the total number of species found within a project planning area is reduced to a subset of species that collectively represent habitats, species, and associated management concerns.

MIS are used to assess the maintenance of populations (the ability of a population to sustain itself naturally) and biological diversity (which includes genetic diversity, species diversity, and habitat diversity), and to assess effects on species that are in public demand.

The Malheur Forest Plan identifies the following aquatic species as MIS for healthy stream/riparian habitats: westslope cutthroat trout, redband/rainbow trout, steelhead, and bull trout (USDA Forest Service 1990a). These aquatic MIS were selected to indicate healthy stream and riparian ecosystems across the landscape. Riparian ecosystems occur at the margins of standing and flowing water, including intermittent stream channels, ephemeral ponds, and wetlands. Attributes of a healthy aquatic ecosystem include: cold and clean water; channel substrates; stable stream banks; healthy streamside vegetation; complex channel habitat created by large wood, cobbles, boulders, streamside vegetation, and undercut banks; deep pools; and waterways free of barriers. Healthy riparian areas maintain adequate temperature regulation, nutrient cycles, natural erosion rates, and provide for in stream wood recruitment.

In general, the aquatic MIS have similar stream and riparian ecosystem requirements. However, they do represent a range of minor differences in habitat conditions found and utilized across the Malheur National Forest. As an example, bull trout require slightly colder water when compared to redband trout. Because the habitat requirements for each species are generally similar and often overlap, they were collectively chosen to represent healthy stream and riparian ecosystems. All aquatic MIS on the Blue Mountain Ranger District of the Malheur National Forest are currently listed as threatened or sensitive.

### *Determining Presence of Species or Habitats*

The following sources of information have been reviewed to determine if threatened, endangered, sensitive, or management indicator species and their associated habitats may or may not occur within the project planning area:

1. Malheur National Forest geographic information system (GIS) database
2. Regional Forester's (R6) sensitive species list (07/21/2015)
3. Oregon Department of Fish and Wildlife stream/fish survey reports
4. Forest Service stream survey reports, Blue Mountain Ranger District, John Day, OR
5. Oregon Natural Heritage Program database
6. NatureServe database (www.natureserve.org/aboutUs/)

### *Aquatic Species with Special Management Status Relative to Analysis Area*

Mid-Columbia River steelhead (threatened, MIS), Interior redband trout (Region 6 sensitive, MIS) (*Oncorhynchus mykiss gairdneri*), westslope cutthroat trout (*Oncorhynchus clarkii*) are documented to occur within the project planning area in the miles of stream listed in Table 68. Table 69 displays designated critical habitat for Mid-Columbia River steelhead within the project planning area. The Columbia spotted frog (*Rana luteiventris*) (R6 sensitive) is considered present in all subwatersheds of the Malheur National Forest and is known to occur within the analysis area.

The following species have not been found within the project planning area nor do they have suitable habitat. The section below provides the rationale for why these species will not be discussed further in the biological evaluation (BE).

- The **shortface lanx** (*Fisherola nuttalli*) (Region 6 sensitive) is a large freshwater limpet that inhabits cold, unpolluted, medium-sized streams to large rivers approximately 30 to 100 meters wide with fast flowing, well-oxygenated water and cobble-boulder substrate at low elevations. This species is not found in areas with a high abundance of macrophytes or epiphytic algae, or in areas that have been dredged or mined. Streams within the project planning area are small in size relative to known species sites. East Fork Beech Creek has warm temperatures, is not considered well-oxygenated, periodically goes dry with stagnant pools remaining, and may have extensive macrophytic algae growth. It is unlikely that the shortface lanx or its habitat is present within the project planning area; therefore, this species will not be discussed further in this BE.
- The **Columbia clubtail** (*Gomphus lynnae*) (Region 6 sensitive) is a dragonfly that can be found in a variety of river habitats that can range from sandy or muddy to rocky, shallow rivers with occasional gravelly rapids. Water flow tends to be slow-moving. Larval habitat (river) is the most crucial. Columbia clubtail are found within Oregon over a somewhat short stretch (about 72 miles) of the John Day River in Wheeler and Grant counties, from Twickenham to Monument; and at a single locality on the Owyhee River near Rome in Malheur County. According to Valley (2010), *G. lynnae* is found over a much longer stretch of the John Day River from Monument to J.S. Burres State Park. Because of the differing stream conditions between the species' type locality and streams within the project planning area, it is unlikely that habitat is found within the project planning area; therefore, this species will not be discussed further in this BE.
- The **Pacific lamprey** (*Entosphenus tridentatus*) (Region 6 sensitive) larvae spend 4 to 6 years in freshwater filtering microscopic plants and animals from bottom sediments. The primary habitat for larvae is muddy bottom, backwater areas, and during its juvenile life stage low gradient areas provide habitat. The Pacific lamprey is susceptible to loss of wetlands, side channels, back eddies, and beaver ponds resulting from agricultural, forestry, or urban development practices or channelization for flood control. High stream temperatures and lack of stream cover can also reduce the lampreys' food supply. Shortly after hatching in freshwater streams, lamprey larvae or amnocoetes drift downstream into areas of low velocity and fine substrates where they burrow and live as filter feeders for up to 7 years. This species may have been historically present within East Fork Beech Creek and its tributaries due to its connection with Beech Creek and the mainstem John Day River. However the current condition of East Fork Beech Creek likely does not support the larval life stage. Stream substrate is primarily cobble with very limited fine material, side channels are largely absent, beaver activity is minimal, and portions of East Fork Beech Creek and its tributaries often go dry during summer months. It is unlikely that the species or its habitat is present within the project planning area; therefore, this species will not be discussed further in this BE.
- **California floater** (*Anodonta californiensis*) (Region 6 sensitive) is a freshwater mussel. The California floater's historical range encompassed the west coast, from Baja California in Mexico to southern British Columbia, and east beyond the Continental Divide. Within the United States, historical distribution of this species includes Arizona, California, Idaho, Nevada, Oregon, Utah, Washington, and Wyoming. This species has been found historically in shell middens in western New Mexico. It has been extirpated from much of its historical range in California and Arizona (Schonberg 2010). Habitat for this species is shallow, muddy or sandy freshwater in large rivers, reservoirs and lakes (Schonberg 2010); suitable habitat also includes low-gradient creeks and streams with steady water levels (Nedeau et al. 2005).

Stream substrate within the Magone project planning area is dominated by large cobble and gravel, and many of the streams do not have steady water levels. Streams within the project planning area have a tendency to fluctuate considerably (flashy) because of snow-pack run-off being the primary driver of flow. No large rivers are present within the project planning area.

- **Western ridged mussel** (*Gonidea angulata*) (Region 6 sensitive). Freshwater mussels, including *G. angulata*, are filter feeders that consume phytoplankton and zooplankton suspended in the water. *G. angulata* is a relatively slow growing and long lived species – perhaps living 20 to 30 years (COSEWIC 2003, Vannote and Minshall 1982). Western ridged mussels have been found within the Middle Fork John Day, North Fork John Day, and John Day River in Wasco County (Xerces Freshwater Mussel database 2009).

  Western ridged mussels are associated with low shear stress (shear stress is caused by fast flowing water over substrate) and substrate stability; flow refuges are important determinants of freshwater mussel survival (Vannote and Minshall 1982). This species is generally associated with constant flow, shallow water (<3 feet in depth), and well oxygenated substrates (COSEWIC 2003), and is often present in areas with seasonally turbid streams. *G. angulata* generally occurs at low to mid elevations (Nedeau et al. 2009). Many sites where this species has been found lack dense macrophyte beds. Typically, individuals of this species are found buried to at least half their length in fine substrate, with the posterior end facing upstream (COSEWIC 2003). Since this species prefers stable habitats, it may be particularly threatened by dewatering and other activities that cause shifting substrates, water level fluctuations, and seasonal hypoxia or anoxia (COSEWIC 2003).

  Many of the streams within the Magone project planning area are partially dry during the summer months. East Fork Beech Creek, the only mid-size stream in the project planning area, is characterized by large cobble with limited flow refuge. It is unlikely that the western ridged mussel or its habitat is present within the project planning area; therefore, this species will not be discussed further in this BE.
- **Pristine springsnail** (*Pristinicola hemphilli*) (Region 6 sensitive). Duncan (2008) states this species of snail is semelparous (reproduces a single time before dying), and males and females live 1 to 2 years. *P. hemphilli* is aquatic and breathes using gills. Snails feed upon algae, yeast, bacteria, and diatoms from rocks and woody surfaces, although they have been known to feed upon other plant surfaces. Plant matter transported by birds and mammals, as well as sediment passively moving downstream, may aid in this species dispersal. This species occurs at sites dominated by small, cold streams that are undisturbed (Duncan 2008). Populations at many of the sites contain hundreds of individuals, although numbers vary considerably from year to year due to environmental factors. *P. hemphilli* can also be found in interior Oregon in the Deschutes, Umatilla, and John Day River basins.

  Habitats supporting this species tend to be small, cold springs or seeps in a pristine condition and contain coarse gravel/cobble substrate (Frest and Johannes 1999). Sometimes snails are found in larger springs or areas of small streams that are affected by springs. Plants commonly found in association with the species include watercress (*Rorippa*), monkey flower (*Mimulus*), and bryophytes (mosses). Sites tend to occur at low-medium elevation and are in semiarid sage scrub. Also, fairly dense Douglas-fir forests at low-medium elevation in the Cascades and Southern Oregon contain this species of snail.

Small, cold springs in pristine condition within lower elevations are absent within the Magone project planning area. Many of the lower elevation streams are currently intermittent and lack spring input. Water temperatures are relatively warm within streams in the Magone project planning area. It is unlikely that the species or its habitat is present within the project planning area; therefore, this species will not be discussed further in this BE.

**Table 68. Miles of habitat for threatened, endangered, and regionally sensitive aquatic species in the Magone project planning area**

| Threatened and endangered aquatic species | Miles of habitat in the project planning area |
|---|---|
| Mid-Columbia River steelhead critical habitat | 19.1 |
| Westslope cutthroat trout | 9.8 |
| Redband trout | 34.7 |

**Table 69. Miles of Mid-Columbia River (MCR) steelhead critical habitat by stream within the Magone project planning area**

| Stream name | Miles of MCR steelhead critical habitat |
|---|---|
| East Fork Beech Creek | 8 |
| Clear Creek | 3.4 |
| McClellan Creek | 4 |
| Tinker Creek | 2 |
| Grub Creek | 2.3 |
| **Total** | **19.1** |

Aquatic species without special management status documented downstream of 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.) Due to similarities in information considered for threatened, endangered, Region 6 sensitive species, and management indicator species analyses, this information is consolidated within individual species narratives below.

### Steelhead – Affected Environment

Mid-Columbia River steelhead (Mid-Columbia distinct population segment, MCR steelhead) were listed by the National Marine Fisheries Service as threatened under the Endangered Species Act on March 25, 1999 (64 FR 15417). MCR steelhead is also a Malheur National Forest MIS species. Critical habitat for MCR steelhead was re-designated on September 2, 2005 (70 FR 52630). Critical habitat is present in the aquatic analysis area.

Steelhead trout are the anadromous form of *Oncorynchus mykiss*. Adult summer steelhead return to freshwater June through September. Adults overwinter in large rivers while sexually maturing and resume migration to spawning streams in early spring. Spawning takes place March through May. Eggs incubate during the spring and emergence occurs April through July depending on water temperatures. Juveniles typically spend 2 to 3 years in freshwater. Juvenile steelhead generally utilize habitats with higher water velocities than juvenile Chinook salmon. In winter, juvenile steelhead utilize deep pools with abundant cover.

Juveniles may reside in their natal stream for their entire freshwater rearing phase or may migrate to other streams within a watershed. Smoltification[12] occurs during late winter and migration to the ocean occurs during spring. Summer steelhead adults normally rear for 1 to 2 years in the ocean.

**Population Status** – Mid-Columbia River steelhead runs in the John Day River Basin are composed of entirely native stocks. However, hatchery fish do stray into the John Day Basin from the Columbia River (CBMRC&D 2005). The Upper John Day River Subbasin contributes approximately 15 percent of the total run for the basin. Spawner abundance in recent years has been moderately variable, the most recent 10-year geomean number of natural-origin spawners was 524 (572 total spawners). The number of steelhead redds counted on index sites within the project planning area are displayed in Figure 48 and Figure 49. Steelhead occupy approximately 410 miles of habitat on the Malheur National Forest. The Magone project planning area encompasses about 4.6 percent of the total miles of habitat on the Malheur National Forest. Juvenile survival for out migration within the Upper John Day is estimated to be 54 percent (NMFS 2008). Mid-Columbia River steelhead are widely distributed in the Upper John Day River Subbasin. Spawning and rearing takes place in all major tributaries of the Upper John Day River and within the Magone project planning area.

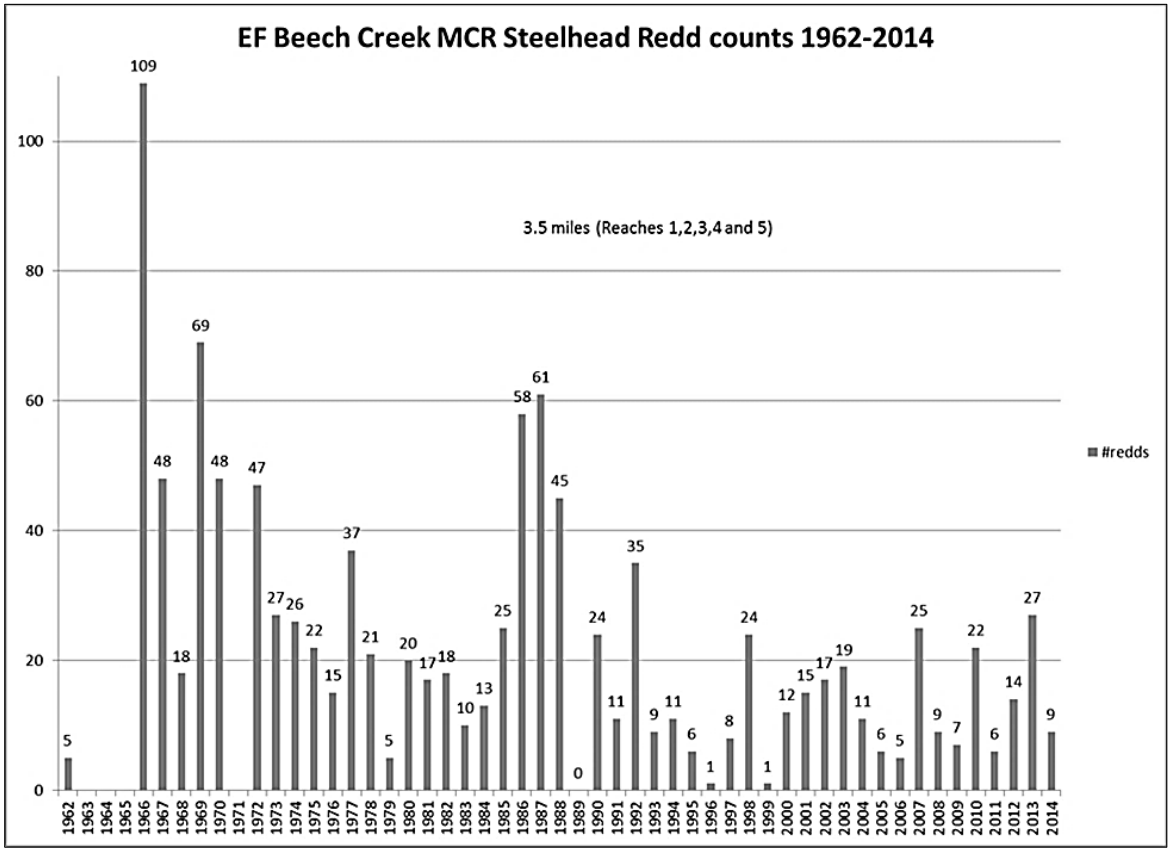


**Figure 48. Number of Mid-Columbia River steelhead redds counted within East Fork Beech Creek index reaches 1962 to 2014.**

[12] Smoltification is the series of physiological changes that occur in juvenile salmonid fish (salmon or trout) to adapt from living in freshwater streams to living in saltwater.

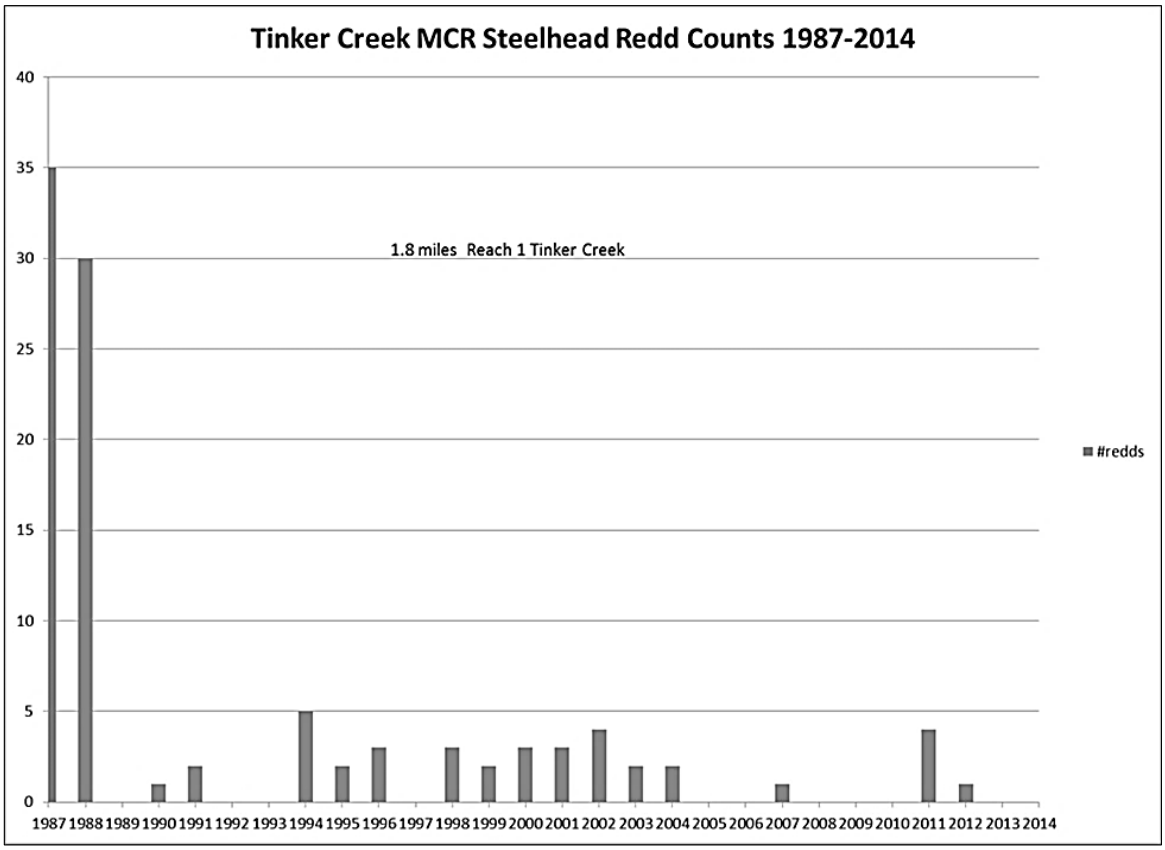


**Figure 49. Number of Mid-Columbia River steelhead redds counted Tinker Creek index reach 1987 to 2014.**

Mid-Columbia River steelhead distribution, spawning habitat, and juvenile rearing habitat is present in East Fork Beech Creek, Clear Creek, Thompson Creek, McClellan Creek, Lake Creek, Tinker Creek, and Grub Creek (Figure 50). Steelhead occupy approximately 19.1 miles of habitat within the project planning area, which represents approximately 4.7 percent of available habitat on the Malheur National Forest. The Magone project planning area is situated centrally in the area of available habitat on the Forest.

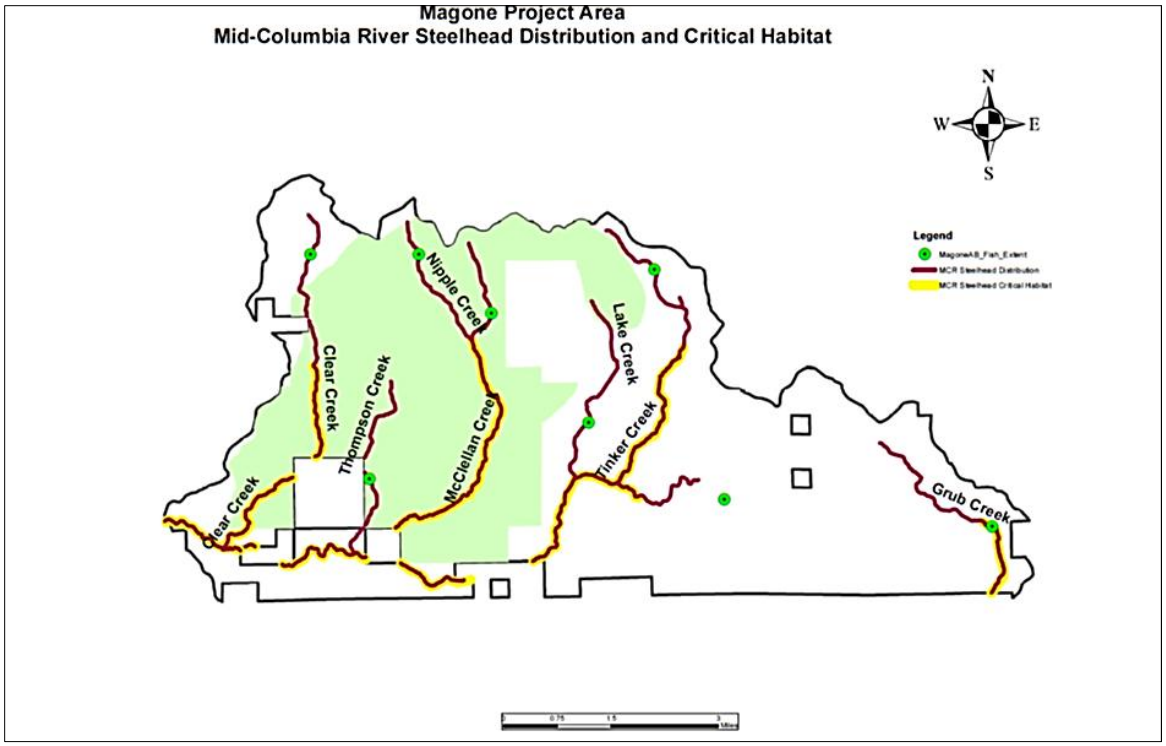


**Figure 50. Mid-Columbia River (MCR) steelhead distribution and critical habitat in the Magone Project analysis area.**

**Critical Habitat** – Critical habitat was designated for MCR steelhead on February 16, 2000 (65 FR 7764). Critical habitat for MCR steelhead under the 2000 rule encompassed the major Columbia River tributaries known to support the distinct population segment, including the Deschutes, John Day, Klickitat, Umatilla, Walla Walla, and Yakima Rivers, as well as the Columbia River and estuary. Critical habitat consisted of all waterways below long-standing (100 years or more), naturally impassable barriers, including the Upper John Day River. The adjacent riparian zone was also considered critical habitat. This riparian zone was defined as the area that provides the following functions: shade, sediment, nutrient/chemical regulation, stream bank stability, and input of large woody debris/organic matter. Protective regulations for MCR steelhead were issued under section 4(d) of the Endangered Species Act (ESA) on July 10, 2000 (65 FR 42423).

In late 2000, a lawsuit was filed challenging the National Marine Fisheries Service (NMFS) February 2000 final designation of critical habitat for evolutionarily significant units/distinct population segments of Pacific salmon and steelhead listed under the ESA. A federal court ruled the agency did not adequately consider the economic impacts of the critical habitat designations. In April 2002, NMFS withdrew its 2000 critical habitat designations.

Critical habitat for MCR steelhead was redesignated on September 2, 2005 (70 FR 52630). Streams listed in Table 69 were designated as critical habitat under the 2005 rule. Designated critical habitat includes the stream channels within the designated stream reaches and includes a lateral extent as defined by the ordinary high-water line (33 CFR 319.11). In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation.

Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge which generally has a recurrence interval of 1 to 2 years on the annual flood series.

The primary constituent elements that are essential for the conservation of listed distinct population segments on the Malheur National Forest are those sites and habitat components that support one or more life stages, including:

(1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development;
(2) Freshwater rearing sites with:
  (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
  (ii) Water quality and forage supporting juvenile development; and
  (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
(3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

**Redband Trout – Affected Environment**

Redband trout exhibit two major life histories, anadromous (steelhead) and potadromous. Potadromous redband trout exhibit a wide variety life history strategies in freshwater systems, including migratory (i.e., fluvial and adfluvial) and resident forms. Interior redband trout are a Region 6 sensitive species and a Malheur National Forest management indicator species. Redband trout are the resident form of *Oncorhynchus mykiss*. Redband trout may or may not be reproductively isolated from steelhead. Redband and steelhead trout from the same geographic area share a common gene pool.

Redband trout are sensitive to changes in water quality and habitat. This species prefer a water temperature range from 10 to 16 °C (50 to 60.8 °F). A range-wide analysis by Muhlfeld et al. 2015 found that redband trout are generally found within streams where pool habitat comprises 35 to 60 percent of the total stream habitat. Poor habitat for redband trout is associated with water temperatures that exceed 16 °C (60.8 °F), fine sediment greater than 25 percent, and a lack of stream shading. In montane streams, the distribution and abundance of redband trout has been positively related to abundance of deep pools with complex cover and negatively related to stream gradient (Meyer et al. 2010, Muhlfeld et al. 2001a, 2001b, Muhlfeld 2002).

Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat functions as important refugia during low water periods. An increase in sediment beyond the capacity of the stream to transport can lower spawning success; sediment reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks, and large woody debris that function in sediment transport and deposition.

Redband trout may reside in their natal stream or may migrate to other streams within a watershed to rear. Habitat requirements are similar for redband trout and juvenile steelhead.

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth, and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailout area of pools. Water temperatures influence emergence of fry, which is typically from May through June.

*Population Status* – Redband trout currently occupy 42 percent of their historical range within the western United States, of which 47 percent of the streams occupied by redband trout occur on private lands, 45 percent on government lands, and 8 percent in protected areas (Muhlfeld et al. 2015). Primary threats to redband trout include invasive species, habitat degradation and fragmentation, and climate change (Muhlfeld et al. 2015).

Neither the Oregon Department of Fish and Wildlife nor the Forest Service routinely monitors abundance and distribution of redband trout in the John Day Basin. Juvenile *Oncorhynchus mykiss* with resident (redband trout) and anadromous (steelhead) life history types are difficult to differentiate where the two populations coexist, making independent monitoring difficult. Redband trout occupy approximately 1,089 miles of habitat on the Malheur National Forest.

*Distribution and Habitat* – Currently in the John Day Basin, redband trout are present in the North Fork, Middle Fork, Mainstem, and South Fork John Day Rivers and their tributaries. Redband trout are present in all fish-bearing streams in the Upper John Day River Subbasin. Summer distribution of redband trout is generally limited to headwater areas.

Redband trout are present in all fish-bearing streams in the aquatic analysis area (Figure 51); however, their population abundance is unknown. Spawning and rearing habitat is present in all fish-bearing streams in the analysis area, with the Upper John Day River also serving as a migratory corridor. Their distribution within the analysis area, and habitat needs, are similar to those of steelhead. However, redband spawning may occur in areas with insufficient flow or two small of substrate for steelhead spawning. Redband trout occupy approximately 34.7 miles of habitat within the project planning area, which represents approximately 3.17 percent of available habitat on the Malheur National Forest. The project planning area is situated centrally within available habitat on the Forest.

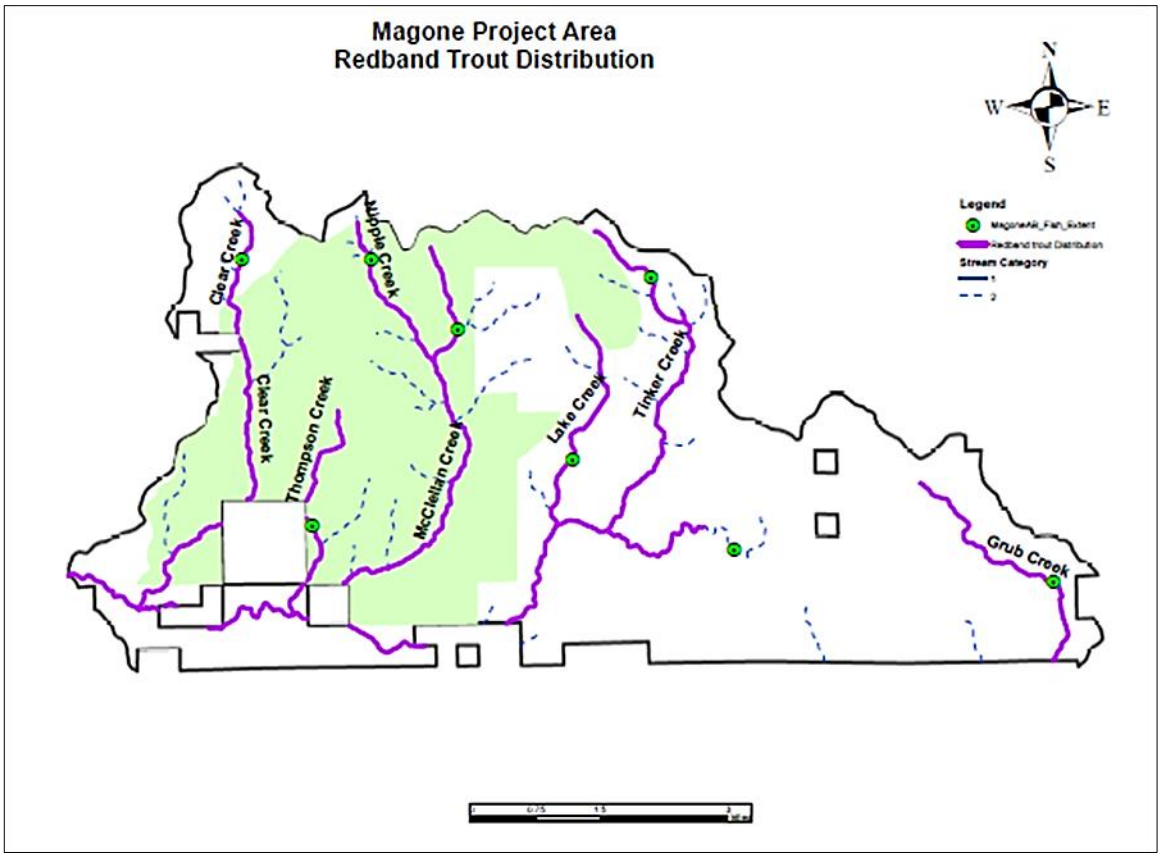


**Figure 51. Distribution of redband trout in the Magone Project analysis area.**

### Westslope Cutthroat Trout – Affected Environment

Westslope cutthroat trout currently occupy about 33,500 miles (59 percent) of the nearly 56,500 miles of historically occupied habitats. However, the genetic status of westslope cutthroat trout across this area has not been determined by genetic testing. Westslope cutthroat trout currently occupy over 18,000 miles in Idaho (95 percent of historical), almost 13,000 miles in Montana (39 percent of historical), about 250 miles in Oregon (21 percent of historical), and almost 2,000 miles in Washington (66 percent of historical).

*Population Status* – Westslope cutthroat trout is a Region 6 sensitive species. Oregon populations of westslope cutthroat trout are disjunct[13] from their greater contiguous distribution in the Upper Missouri and Columbia basins of Montana and Idaho (Behnke 1992). Westslope cutthroat trout currently occupy 59 percent of their historical range (Shepard et al. 2005). East Fork Beech Creek and its tributaries are part of the Beech Creek population within the Magone project planning area (Figure 52). Most populations express resident life history strategy, but migratory forms do exist within the Upper John Day Complex (Shepard et al. 2003).

There are 17 westslope cutthroat trout populations found within the Upper Mainstem John Day River. Distribution of westslope cutthroat trout is highly fragmented and limited to headwater streams in the Upper John Day River Basin (Figure 53). The Beech Creek population is located in the Magone project planning area and includes the streams of East Fork Beech Creek, Lake Creek, and Thompson Creek.

[13] Disjunct species are those that exhibit unusually wide gaps within their overall distribution.

The Beech Creek population does not pass distribution criterion being found within only 15 percent of their historical distribution within the watershed. Most populations are isolated from each other due to elevated water temperatures and low flows (Kostow 1995).

*Habitat in the Analysis Area* – Water temperatures greater than 20 °C (68 °F) are not favorable to westslope cutthroat trout and favor rainbow trout (Bear 2007). Approximately 75 percent of cutthroat populations within the Pacific Northwest are found in streams greater than11°C (51.8 °F) (Isaak 2015). Habitat within the project planning area includes East Fork Beech Creek, Thompson Creek, and Lake Creek totaling approximately 9.8 miles. There are 150 miles of occupied westslope cutthroat habitat within the Malheur National Forest and the area within the Magone Project represents approximately 6.5 percent of available habitat on the Forest. Westslope cutthroat have not been captured within East Fork Beech Creek (Reach 7) since 1993 when the previous R6 stream survey was conducted. Fish distribution surveys conducted in 2014 did not capture any westslope cutthroat.

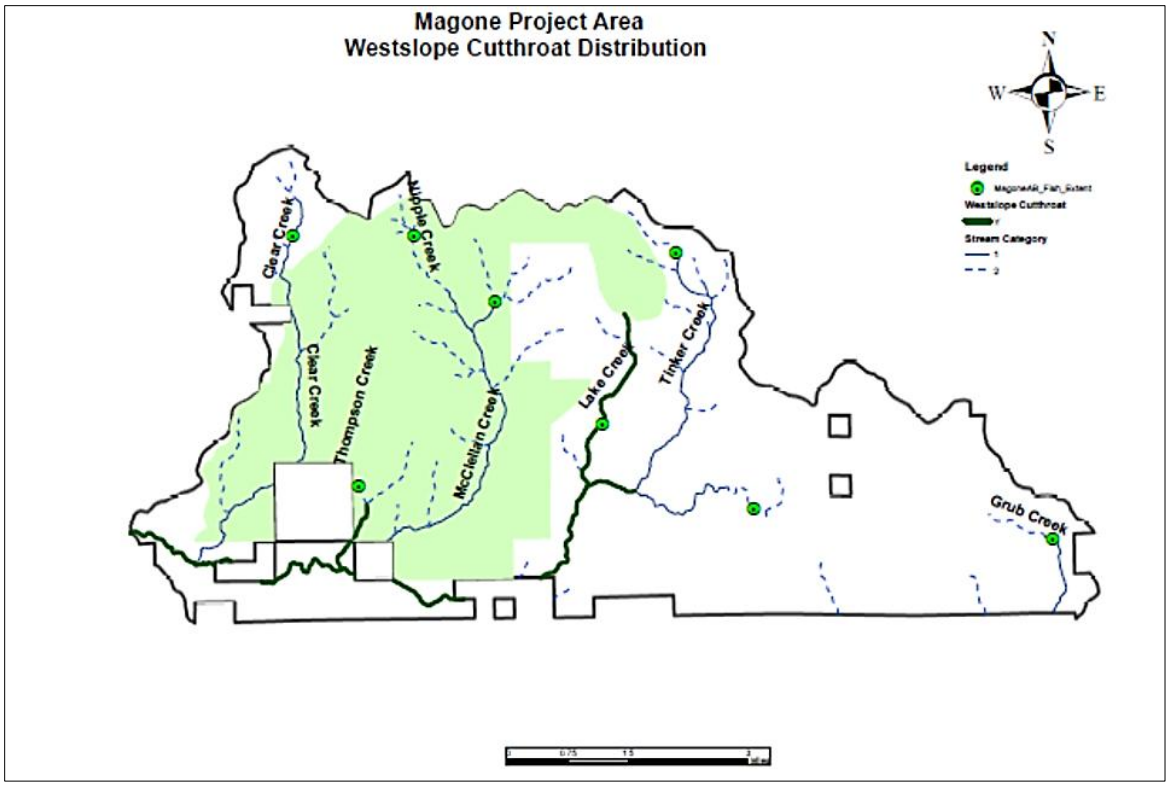


**Figure 52. Westslope cutthroat distributions within the Magone project planning area.**

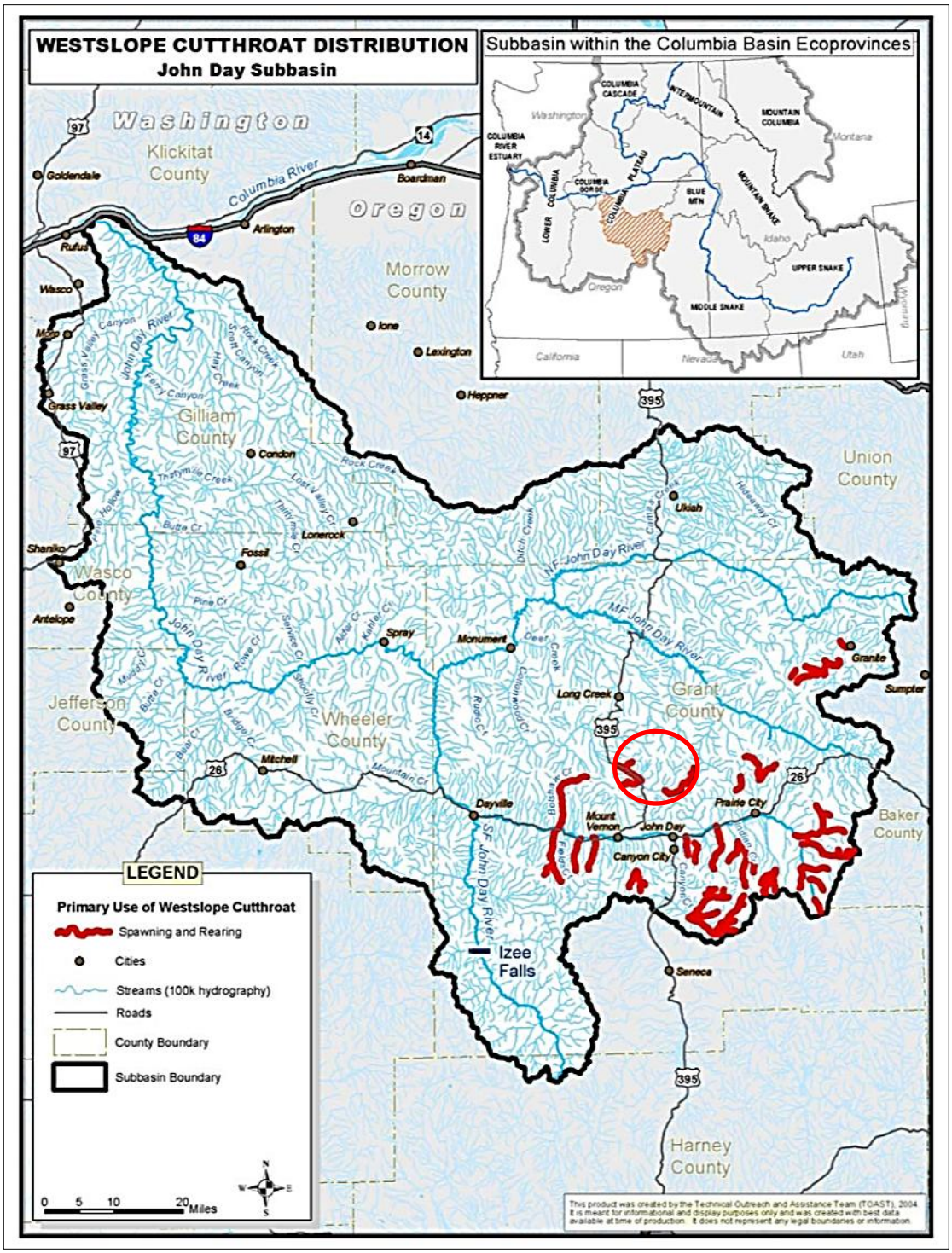


**Figure 53. Westslope cutthroat distribution within the John Day subbasin (John Day Subbasin Plan 2005). Red circle indicates project planning area.**

## Columbia Spotted Frog – Affected Environment

The Columbia spotted frog is a Region 6 sensitive species. Spotted frogs are highly aquatic and are rarely found far from permanent water. They are most commonly associated with perennial streams, and less commonly in lakes, ponds, springs, and marshes.

During winter, spotted frogs burrow into banks adjacent to streams, ponds, and springs. Breeding occurs in the spring varying with elevation. In the Columbia Basin of Washington, breeding occurs March to April in lower elevations and May to June in the higher elevations. Breeding habitat is usually found in quiet waters along streams or shallow water in ponds. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding.

Spotted frogs may be considered to occupy a similar range as redband trout on the Forest due to their predominantly stream-oriented habitat use. Spotted frogs would thus occupy approximately 42.7 miles of habitat within the project planning area, which represents approximately 3.9 percent of available habitat on the Malheur National Forest. The project planning area is situated centrally within available habitat on the Forest.

**Population Status** – This species occurs in extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming. Disjunct populations occur on isolated mountains and in arid-land springs. In Oregon, Columbia spotted frogs appear to be widely distributed east of the Cascade Mountains.

The U.S. Fish and Wildlife Service lists livestock grazing and introduction of nonnative fish (salmonids and bass) as primary threats to the Great Basin population of Columbia spotted frogs (66 FR 1295).

**Habitat in the Analysis Area** – The spotted frog is considered present in all subbasins on the Malheur National Forest, including the Magone aquatic analysis area. It is assumed this species is widely distributed in the Upper John Day River Subbasin. Limited habitat surveys have been conducted specifically for spotted frogs; however, habitat probably exists along low gradient perennial streams. Fish surveys record incidental sightings of frogs but most do not differentiate species.

## 3.8.2 Environmental Consequences

### 3.8.2.1 Issues Addressed and Indicators for Assessing Effects

The measurement indicators detailed in Table 67 and described above, are used for assessing the effects to aquatic species and habitat in the Magone project planning area.

### 3.8.2.2 Methodology

Information for the aquatic analysis was compiled from multiple sources. Region 6 (R6) stream survey reports provided existing condition data. Table 66 lists the most recent stream surveys and data for the six primary aquatic habitat elements for 13 streams in the analysis area. The Aquatic Resources Report – Appendix A displays stream survey data for the six primary habitat indicators and several other habitat metrics for surveys completed prior to and during 2014. Additionally, all Category 1 streams within the project planning area were walked by the project fish biologist.

The existing condition for potential fish-bearing streams that have not been surveyed but walked by the fish biologist were evaluated qualitatively, based on principles of applied fisheries and watershed science, professional judgment, and knowledge of the area. Other sources of information considered for this report include field trips to perennial portions of fish-bearing streams within the project planning area, the Forest GIS spatial and tabular data, Forest water temperature monitoring data, streamnet.org, discussions with Oregon Department of Fish and Wildlife personnel from the John Day Watershed District, and discussions with personnel from the Confederated Tribes of the Warm Springs Reservation of Oregon. Analysis for aquatic habitat was conducted by analyzing the impacts of the action for each alternative on the six aquatic habitat elements.

### *Spatial and Temporal Context for Effects Analysis*

The project planning area lies within the Beech Creek Watershed of the Upper John Day River Subbasin. The analysis area encompasses all known and potential habitats for threatened, endangered, Region 6 sensitive species and management indicator species that may be affected by the Magone Project. Based on topography, drainage patterns and the effects analysis, the Aquatic Analysis area (action area) includes the following streams and their tributaries: East Fork Beech Creek, Clear Creek, Thompson Creek, Lake Creek, Tinker Creek, and Grub Creek. Measurable effects from proposed activities are unlikely to extend downstream of this area. The analysis area for aquatic species and the cumulative effects boundary are the same as used for aquatic habitat.

Effects timeframes for direct, indirect, and cumulative effects varies by habitat element. Measureable improvements in pool frequency, large woody debris, width-to-depth ratios, and bank stability are expected to occur immediately following habitat restoration activities identified in foreseeable actions related to aquatic restoration, and persist in the long-term (35 years or more).

A short-term increase (1 to 5 years) in fine sediment/embeddedness may occur at and immediately downstream of aquatic habitat restoration treatment sites, but treatments would lead to a long-term reduction (5 years or more) in fine sediment levels and therefore would have beneficial impacts to aquatic habitat and fish.

Stream shading may be reduced in the short-term (5 to 10 years) at habitat restoration sites immediately following treatment, but is expected to return to baseline levels after that period. Measurable improvements in stream shading are expected to occur in the long-term (beyond 10 years) once the synergistic benefits of the proposed action and cumulative effects of improvements in passive riparian management are realized. Measureable increases in water temperature associated with the minor short-term reductions in stream shading are not anticipated to occur due to adherence to PDCs within the Aquatic Restoration EA/ARBO II and obtaining instream wood from upland sources where feasible. Restoration activities would have long-term beneficial impacts to aquatic habitat and fish.

Measurable improvements in water temperature are expected to occur in the long term beginning approximately 10 years after treatments, particularly in East Fork Beech Creek, once water storage, sediment transfer, riparian hardwood communities, and floodplain connectivity within McClellan Creek, Clear Creek, Thompson Creek and Tinker Creek are restored. Such improvements are expected to extend downstream of the project planning area to approximately the confluence of Beech Creek and possibly downstream into other aquatic restoration work occurring on Beech Creek private lands.

Reduced peak flows and increased base flows associated with riparian and upland treatments are anticipated to contribute to reductions in water temperature in the long-term as well. Increases in air temperature and reductions in snow pack (with associated increases in stream temperatures) described in some global climate change projections may offset expected improvements in stream temperatures resulting from the proposed action. However, the expected improvements in riparian vegetation and hydrological processes (water conveyance and storage) is expected to provide the resiliency required to prevent further water temperature warming than currently exists even with projected climate scenarios.

### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

All past activities, past wildfires, present activities, foreseeable activities, and the current project proposal have been considered for their cumulative effects on aquatic habitat and associated aquatic species. Effects are addressed for all aquatic species considered in this analysis together due to the insignificant differences between the species' niches. The following discussion focuses on the past, ongoing, and foreseeable future activities that may contribute positive or negative effects. The effects determination and rationale by species and alternative are discussed in the effects section and summarized in Table 98. The analysis area for aquatic species and the cumulative effects boundary are the same as used for aquatic habitat.

During the past 100 years, homesteading, water diversions, livestock grazing, mining, timber harvest activities, stream dewatering, firewood cutting, fire suppression, road construction, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes that may have affected processes such as overland flows, channel development, and riparian and fish habitat within the drainages associated with this project. Legacy effects from past management activities may continue to impact aquatic habitat in the project planning area and downstream of the project planning area. The magnitude and timing of these potential impacts are unpredictable, but they would have short-term (1 to 3 years) to long-term (50+ years) negative effects on fisheries habitat in this watershed.

There has been a marked shift in the last 10 years to more intermediate harvest and greater crown retention. Since the PACFISH amendment (1995) to the Malheur Forest Plan, RHCAs are left intact, thus limiting the effects to riparian habitat and stream channels. Recent projects on the Forest incorporate watershed restoration activities that include increasing the size of culverts and removal of fish passage barriers, restoring streams to their historical channel alignment, installing fish screens to prevent entrainment, implementing best management practices, and decommissioning roads to decrease erosion and sediment delivery to streams.

The no action alternative would permit a natural, slow, partial recovery from effects of past mining, grazing, riparian road construction, and riparian harvest. This recovery would occur as riparian trees grow larger, as large wood falls into the streams, as channel types change to more stable and narrow configurations, as sediment from past actions is washed out, and as riparian shrubs and sedge communities recover and contribute to more stable stream banks. Recovery would be only partial because some ongoing impacts from some existing roads would not permit full recovery.

Stream reach vegetation on East Fork Beech Creek has improved due to riparian fencing, changes in livestock management, and riparian planting. Additionally, current grazing management practices within the project planning area have allowed stream reaches to improve and develop an upward trend. However, legacy timber harvest, adjacent roads, and stream crossings within the project planning area resulted in degraded stream conditions that the East Fork Beech Creek does not have the competency to recover from under current climatic conditions.

Under the action alternatives, the hazard of severe crown fire is lower than under the no action alternative, as described in the Fire, Fuels, and Air Quality Report and section.

The Camp Lick Project is a watershed restoration project currently in the early planning stages and would be a similar scale and include similar types of actions as the Magone Project; the effects to aquatic habitat and species would likewise be similar.

### *Foreseeable Aquatic Restoration Actions in conjunction with Magone Project Actions Effects on the Six Primary Habitat Elements*

Foreseeable aquatic restoration activities are summarized within Table 14. The effects of these aquatic restoration actions on the six primary habitat elements are summarized below and included in cumulative effects.

#### Pool Frequency

Aquatic habitat restoration activities proposed for the Magone project planning area may result in short-term cumulative effects because the proposed activities would likely result in short-term increases in fine sediment that may reduce pool frequency within localized areas. The short-term sediment increases may add to adverse effects because many streams in the analysis area presently do not meet objectives for pool frequency and associated impacts to aquatic habitat and salmonids. However, the proposed aquatic habitat restoration activities would address current altered fine sediment transport processes and the lack of hydrological features that support pool formation, leading to a long-term reduction in fine sediment levels and an increase in pool frequency. Aquatic habitat restoration activities would therefore have beneficial impacts to aquatic habitat and fish in the long-term. (See spatial and temporal context effects discussion above.)

#### Stream Shading and Water Temperature

Aquatic habitat restoration activities proposed for the Magone project planning area may result in short-term cumulative effects because the proposed activities would likely result in short-term decreases in stream shade. The short-term decrease may add to adverse effects because many streams in the analysis area presently do not meet objectives for water temperature and associated impacts to aquatic habitat and salmonids. However, the proposed aquatic habitat restoration activities would address the current riparian hardwood absence from localized stream reaches and reconnect floodplains through elevating water tables and invigorating riparian hardwood growth, leading to a long-term increase in stream shade levels and cool water storage resulting in improved water temperatures. Aquatic habitat restoration activities would therefore have beneficial impacts to aquatic habitat and fish. (See spatial and temporal context effects discussion above.)

### Large Woody Debris

Aquatic habitat restoration activities proposed for the Magone project planning area may result in short-term cumulative effects because the proposed activities would likely result in short-term and long-term increases in large woody debris (LWD). The short-term increases would benefit many streams in the analysis area that presently do not meet objectives for LWD and associated impacts to aquatic habitat and salmonids. The proposed aquatic habitat restoration activities would address the current lack of LWD and the lack of hydrological features that support water storage, leading to a long-term increase in stocking levels of LWD for future recruitment. Aquatic habitat restoration activities would therefore have beneficial impacts to aquatic habitat and fish. (See spatial and temporal context effects discussion above.)

### Fine Sediment and Embeddedness

Aquatic habitat restoration activities proposed for the Magone project planning area may result in short-term cumulative effects because the proposed activities would likely result in short-term increases in fine sediment. The short-term sediment increases may add to adverse effects because many streams in the analysis area presently do not meet objectives for embeddedness and fine sediment and associated impacts to aquatic habitat and salmonids. However, the proposed aquatic habitat restoration activities would address current excessive fine sediment input and lack of hydrological features that support fine sediment deposition, leading to a long-term reduction in fine sediment levels. Aquatic habitat restoration activities would therefore have beneficial impacts to aquatic habitat and fish. (See spatial and temporal context effects discussion above.)

### Bank Stability and Width to Depth

Aquatic habitat restoration activities proposed for the Magone project planning area may result in short-term cumulative effects because the proposed activities would likely result in short-term increases in bank instability. The short-term increases would not result in an adverse effect to bank stability because the majority of streams meet bank stability criteria. Additionally, these banks are artificial in that they are cobble-dominated as a result of altered hydrology and sediment transport processes. Aquatic restoration activities may add to adverse effects related to width-to-depth ratios because many streams in the analysis area presently do not meet objectives for width-to-depth ratios and associated impacts to aquatic habitat and salmonids. However, the proposed aquatic habitat restoration activities would address current width-to-depth ratios and lack of the hydrological features that support fine sediment deposition (streambank building characteristics) and reduce streambank sheer stress, leading to a long-term reduction in fine sediment levels and width-to-depth ratios, and an increase in floodplain connectivity. Aquatic habitat restoration activities would therefore have beneficial impacts to aquatic habitat and fish. (See spatial and temporal context effects discussion above.)

Project design criteria (PDCs) for aquatic restoration activities include those identified in the Aquatic Restoration Biological Opinion (ARBO II) (USDI FWS 2013a) and those within the Malheur National Forest Aquatic Restoration Environmental Analysis (USDA Forest Service 2014a). The ARBO PDCs and Aquatic Restoration EA PDCs specific to this project would be implemented as described in the ARBO and the Aquatic Restoration EA. In addition, any Reasonable and Prudent Measures and Terms & Conditions (RPMs and T&Cs) from Endangered Species Act section 7 consultation with National Marine Fisheries Service and the U.S. Fish and Wildlife Service are non-discretionary and must be implemented as part of the Magone Project to minimize the amount or extent of incidental take of steelhead. The RPMs and T&Cs are included in Appendix C – Project Design Criteria.

The PDCs, RPMs, and T&Cs would reduce the probability and magnitude of this short-term risk. After about 2 years, effects of these activities are beneficial for water quality and fish habitat, including reduced sediment yield from the road prism.

The 2005 Final Rule for Travel Management; Designated Routes and Areas for Motor Vehicle Use (Travel Management Rule) requires national forests and ranger districts to designate those roads, trails, and areas that are open to motor vehicle use. The Malheur National Forest is not undertaking this process at this time. However, implementation in the future could restrict motorized travel to designated routes and restrict motorized cross-country travel. Implementation of this Rule on the Forest would reduce negative impacts to aquatic species and habitat associated with motorized travel within RHCAs.

Currently, invasive plants on the Forest may only be treated mechanically, therefore, without herbicides; there would likely be cumulative effects on aquatic species due to habitat degradation along stream banks. Treatment of invasive plant infestations are authorized in the Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015b). Future treatment of these infestations would cumulatively result in fewer invasive plants and thus less impact to riparian areas and aquatic habitats especially related to spotted knapweed infestations on East Fork Beech Creek.

The effects of other foreseeable activities described above on aquatic species are negligible with the exception of irrigation withdrawals that are potential temperature concerns. The effects of use and maintenance of roads that are not decommissioned would remain the same as at present.

### 3.8.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

Under alternative 1, there would be no management activities associated with timber harvest, fuels treatments, and recreation in the project planning area; however, there would be cumulative effects as described below. Roads would not be treated in this alternative, which would allow several miles of roads to continue acting as potential sediment sources, impede and intercept overland water flow and ground water seepage. Undersized culverts would continue to alter sediment transfer regimes within the East Fork Beech Creek and Grub Creek subwatersheds and act as sediment sinks retarding streambank and point bar formation. Conveyance of snowmelt and water across the project planning area would continue at an expedited rate within streams due to channel straightening and floodplain disconnection. Meadows with incised channels would continue to lose water storage capacity resulting in earlier and more frequent streambed drying events and less water storage capacity.

The hazard of a severe crown fire would be higher especially for those areas surrounding Magone Lake and within the Nipple Butte IRA, as described in the Fire, Fuels, and Air Quality Report and section. Most of the forested stands in the project planning area are identified as moderate to high risk for stocking induced mortality and related infestation of pests or disease. Without silviculture treatment and/or the controlled re-introduction of fire into the project planning area, current stand conditions would worsen and increase the chance of a stand replacement fire. A stand replacement wildfire would result in the loss of shading along stream channels, loss of instream wood, and both short-term (3 to 5 years) and long-term (10 to 50 years) loss of streamside vegetation. This could adversely affect fish habitat. Water temperatures would increase, for perhaps one to a few decades, depending on riparian shrub and tree recovery. Sediment from upland sources could increase for 1 to 5 years following a fire.

Sediment from channel sources could increase due to higher peak flows and loss of stabilizing trees and shrubs. However, recovery of bank stabilizing herbaceous and shrubby vegetation would probably limit increased sediment from channel sources to less than 5 years. Severe fire would also supply an extended pulse of woody debris to streams, which would gradually decay over decades. In addition, localized extirpation of these fish could occur as the result of severe wildfires (Rinne 1996).

As noted by Dunham et al. (2003), the effects of wildfires depend on a variety of factors including their timing, location, area, extent, and intensity. Other factors include the characteristics of the ecosystems and the species affected along with other indirect physical and ecological linkages. While such events can cause short-term negative effects, such as those listed below, over long time periods the resulting habitat conditions may be more productive then in areas where natural disturbance has been suppressed (Dunham et al. 2003). Wildfires can have a number of detrimental effects to stream channels such as decreasing stream channel stability, increasing discharge and affecting discharge variability, altering LWD delivery and storage, increasing nutrient availability, increasing sediment delivery and transport, increasing solar radiation and altering water temperature regimes (Dunham et al. 2003). In cases where natural stream processes are already impaired (Table 66), the recovery of the stream ecosystem from the effects of severe wildfire is likely to be slower, more sporadic, and potentially incomplete (Minshall 2003).

Recreational opportunities related to hiking, biking, and fishing within the Magone Lake recreation area would remain the same. Public use of the existing facilities is likely to increase in the future. The increase in recreational use may contribute to degradation of shoreline vegetation that functions in stabilizing the shoreline and provides large woody debris and shade.

Fish habitat improvement (fish cribs and fish sticks) in Magone Lake would not occur under the no action alternative. Existing woody debris within the lake would continue to decay and break down, resulting in less aquatic habitat for game fish, forage fish, aquatic macro invertebrates and waterfowl. Recruitment of wood into the lake would remain sporadic and limited in extent due to lack of sufficient trees to supplement existing wood. Carrying capacity of existing fish populations and growth rates would remain stagnant with little opportunity for increase. The number of large size fish would remain a small fraction of the population as a whole without rigorous supplementation (i.e., stocking of large fish).

**Direct and Indirect Effects – Pool Frequency**

Alternative 1 would maintain the current levels of pool habitat, which are below objectives for streams in the analysis area (Table 66) and limit important habitat for salmonids, especially for rearing juveniles and adults migrating prior to spawning.

**Direct and Indirect Effects – Water Temperature and Stream Shading**

Alternative 1 would maintain the current levels of stream shading, with perhaps a slow increase as trees in previously logged riparian areas continue to grow at a retarded rate due to overstocked stands. Current water temperatures exceed or are at maximum threshold objectives for water temperature in nearly all streams in the analysis area (Table 66). Mean maximum water temperatures are at the maximum threshold range for westslope cutthroat trout, redband trout, and juvenile steelhead that are all present in the aquatic analysis area during the summer months.

Water temperatures in most streams within the aquatic analysis area would likely not change over the short-term due in part to the influence of riparian shrub browse on streamside vegetation, lowered water tables, limited beaver activity, and disconnected floodplains. Water temperatures in EF Beech Creek and tributaries may slowly improve as streamside vegetation responds to improvements in range management activities. Recent range monitoring indicates that there is an upward trend in channel and stream bank vegetation in the analysis area. However, climate change models predict increases in air and water temperatures in the long-term (see Watershed Report). Additionally, precipitation within the project planning area is expected to change from a snowmelt driven system to a rain-driven system, with no snowpack by the year 2080.

The hazard from severe wildfire would be the highest under the no action alternative. If a severe wildfire does occur, stream temperatures would likely increase due to a large-scale decrease in stream shading; in particular for the riparian areas within the Nipple Butte IRA and East Fork Beech Creek.

**Direct and Indirect Effects – Large Woody Debris**

Alternative 1 would maintain current levels of large woody debris (LWD). Current levels of LWD are below objectives for all streams in the project planning area (Table 66) and is resulting in degraded stream conditions including low pool frequencies. Replacement LWD would be recruited into stream channels as conifers die and fall into streams, stream scour undermines root systems, and from windfall or hillslope slide events. Within incised/confined channels, wood would likely be suspended over the channel and not become incorporated as functional LWD immediately. However, depending on tree species decay rates, over time these pieces break and are incorporated into the floodplain and stream channel. Limbs, treetops, and individual pieces of the tree bole become coarse woody debris, which are an integral part of debris jams associated with key pieces or LWD. Within 25 years, LWD would likely increase over current levels in the project planning area because trees present in the floodplain of most stream reaches in the project planning area would fall into streams. However, Forest roads located parallel to East Fork Beech Creek, lower reaches of Tinker Creek, Thompson Creek, and Magone Lake within RHCAs, decrease the area available for LWD growth and increase the removal of trees for firewood. In addition to roads paralleling these streams, under-sized culvert crossings effectively eliminate opportunities for conveyance of coarse woody debris downstream from source tributaries into East Fork Beech Creek, thus decreasing instream fish habitat complexity.

The hazard from severe wildfire would be higher under alternative 1 than alternatives 2, 3, and 4 as shown in the Fire, Fuels, and Air Quality Report and section. If a severe wildfire does occur, a pulse of large wood likely would fall in most streams within the project planning area over an extended period. The development of large wood along reaches with relatively few trees within the floodplain would be postponed for 90+ years until trees grow to suitable size and become recruited into the stream.

**Direct and Indirect Effects – Embeddedness and Fine Sediment**

Alternative 1 would maintain the current levels of fine sediment and embeddedness over much of the analysis area. Existing fine sediment levels are likely having adverse impacts to aquatic habitat. These adverse effects include reduced spawning success for salmonids and reduced quality of rearing habitat for juvenile salmonids. Fine sediment levels in the streams discussed above would slowly decrease as channels stabilize from past grazing and road building. However, native surface roads that are contributing fine sediment would stay in their current condition.

The hazard from severe wildfire would be higher under alternative 1 than alternatives 2, 3, and 4 as shown in the Fire, Fuels, and Air Quality Report. If a severe wildfire does occur, a pulse of sediment would likely enter the streams due to soil erosion, and due to channel erosion from increased peak flows and decreased root structure on stream channels.

Existing native surface roads located in RHCAs would remain. Delivery of fine sediment to streams would continue at their current levels. Stronghold populations of salmonids are associated with higher elevation forested lands, and the proportion declines with increasing road densities (Quigley et al. 1996). The higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Specifically, Quigley et al. (1996) showed a strong correlation with road densities of 2 miles per square mile or higher and reduction of strong populations of salmonids. Further reductions of strong salmonid populations were identified at densities of 3 miles per square mile and 4 miles per square mile or greater. Roads in the project planning area that occur within 100 feet of streams, or cross streams, commonly impact fish and fish habitat more than roads located in uplands.

A high percentage of roads in RHCAs in the project planning area are native surface roads that contribute fine sediment to streams, which adversely affects aquatic habitat. Total open and closed road densities are approximately 2.6 miles per square mile. There are approximately 23 miles of roads in the project planning area that impact streams due to proximity (100 feet or less). These conditions reduce availability of subsurface cool water storage and have caused streams to become disconnected from floodplains.

**Direct and Indirect Effects – Width-to-Depth Ratio**

Alternative 1 likely would maintain the current width-to-depth ratios over much of the analysis area. Width-to-depth ratios are higher than objectives for 26 reaches of the 28 surveyed stream reaches in the analysis area (Table 66) and are likely having adverse effects to aquatic habitat, primarily through altered sediment routing and elevated water temperatures. Adjacent roads are influencing the channel morphology of several of these streams by conveying water off adjoining hillslopes at elevated rates and altering sediment transport through modification of tributary alluvial fans. Livestock grazing to Malheur Forest Plan standards on allotments within the analysis area and natural LWD recruitment should maintain or slowly improve width-to-depth ratios of these streams.

**Direct and Indirect Effects – Bank Stability**

Alternative 1 would maintain the current levels of bank stability. Bank stability is generally high in the analysis area with the exception of specific locations where bank instability is occurring due to altered hydrological processes. Altered hydrology can result in high streambank stability (as observed within East Fork Beech Creek), and lack of instream complexity and roughness has resulted in banks that are composed primarily of large cobble due to flushing flows preventing deposition of fine material. Range allotment monitoring in allotments within the analysis area indicates that bank stability is on an upward trend. This trend is expected to continue under current grazing levels.

**Cumulative Effects – No Action**

Under the no action alternative, streams would continue functioning in a degraded state, negatively affecting aquatic species habitat within the project planning area and downstream reaches. 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. The risk of severe wildfire would continue and wildlife habitat in upland areas would continue to decline in vegetative structure, resulting in a decrease of mountain mahogany and bitter brush within the project planning area.

In the long-term, aquatic restoration activities would improve riparian condition and all six primary habitat elements within the project planning area; however, the activities may have short-term negative and meaningfully measurable effects as described above. (See discussion of aquatic restoration effects Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis above and Table 94 below.) Road and crossing improvements related to haul would not occur in this alternative, which would allow several miles of roads to continue acting as potential sediment sources, impede and intercept overland water flow, sediment transport and ground water seepage. Temporary road construction for haul would not occur and therefore effects related to fine sediment would not occur under the no action alternative. The threat of severe wildfire within the project planning area and its potential impacts on aquatic organisms would increase into the future under the no action alternative. Recreational opportunities within the Magone Lake area would remain as they are with limited hiking and biking opportunities. Effects related to new trail stream crossings and trail construction within 100 feet of RHCAs would not occur under the no action alternative. Boating facilities would remain minimal with an expected increase in recreational use. Pedestrian traffic related to several activities occurring within a small localized area adjacent to Magone Lake would continue to impact shoreline vegetation.

**Direct and Indirect Effects – Aquatic Species**

*Steelhead Determinations:*

- Mid-Columbia Summer Steelhead ESA Determination (T): No Effect (NE).
- Mid-Columbia Summer Steelhead Sensitive Species Determination (S): No Impact (NI).
- Steelhead Management Indicator Species Determination (MIS): No Impact to Viability.
- Steelhead Designated Critical Habitat ESA Determination (D): No Effect (NE).

*Redband Trout Determinations:*

- Interior Redband Trout Sensitive Species Determination (S): No Impact (NI).
- Redband Trout Management Indicator Species Determination (MIS): No Impact to Viability.

*Westslope Cutthroat Trout Determinations:*

- Westslope Cutthroat Trout Sensitive Species Determination (S): No Impact (NI).
- Westslope Cutthroat Trout Management Indicator Species Determination (MIS): No Impact to Viability.

*Columbia Spotted Frog Determination:*

- Columbia Spotted Frog Sensitive Species Determination (S): No Impact (NI).

**Rationale:**

The following rationale is specific for actions proposed within the scope of this DEIS without the separate aquatic restoration actions covered under the Malheur National Forest Aquatic Restoration Environmental Assessment and Decision Notice (USDA Forest Service 2014b). With implementation of aquatic restoration actions, a short-term adverse effect is expected for MCR steelhead critical habitat; however, a long-term beneficial effect to critical habitat is expected.

Habitat for MCR steelhead, redband trout, Westslope cutthroat trout, Columbia spotted frog, and western ridged mussel in the aquatic analysis area is currently in a degraded state; high water temperatures, high fine sediment levels, low LWD levels, and loss of floodplain connectivity from past land management practices have reduced the habitat capability of streams in the aquatic analysis area to support these species and limited recovery of degraded area. Loss of cold-water storage in meadows and stream networks has increased peak flows, reduced baseflows, and elevated water temperatures toward the upper end of thermal limits for salmonids. Legacy road and riprap in East Fork Beech Creek and associated tributaries and loss of floodplain and alluvial fan connectivity has resulted in high stream energy that prevents smaller streambed substrates from depositing resulting in a plane bed stream channel dominated by cobble. This reduces the available spawning sites for steelhead, redband, and Westslope cutthroat trout.

The hazard from severe wildfire would be higher under this alternative than alternatives 2, 3, and 4. If a severe wildfire does occur, the lack of aquatic habitat connectivity may prevent fish from recolonizing disconnected streams after fire-related local extirpation (Rinne 1996).

Alternative 1 proposes no new activities. A slow and partial recovery of some habitat conditions would occur as a result of passive improvements in overall land management. If alternative 1 is selected, it is still a decision to do something. This would be choosing to allow habitat conditions that led to reduced viability of these species to continue having negative effects, especially within the upland areas.

**Cumulative Effects**

**Effects of Ongoing and Reasonably Foreseeable Actions for All Alternatives** – Potential effects from alternative 1 would be cumulative with effects from non-federal activities within the project planning area and activities within the aquatic analysis area on federal, state, and private lands. Aside from this project, other non-restoration activities that may contribute to cumulative effects include: timber harvest activities, wildfires, livestock grazing, road use, flood irrigation/water diversion, and vegetation alteration.

The aquatic restoration actions covered under the Aquatic Restoration Decision would alleviate degraded conditions within RHCAs but would have short-term adverse effects to several of the primary habitat elements resulting in long-term benefits. (See discussion of aquatic restoration effects Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis above.) The aquatic restoration activities would have a beneficial effect for all aquatic species listed above but the long-term benefit of these activities would not be realized to the extent that they could be under the no action alternative. However, severe wildfire would continue to be a threat and upland forest health would continue to decline. While often separated the line between riparian and uplands is often blurred and many of the conditions observed within riparian areas are a function of the condition within the uplands and how water and sediment is conveyed across the landscape. Riparian health and upland health are integrally connected between both physical and biological components. Because of this relationship, only treating areas within the RHCA (under Aquatic Restoration Decision activities) may limit the extent and scope of recovery for the six primary habitat elements related to fish habitat. Processes related to the connectivity of upland, riparian, hydrology, sediment transport and geomorphology within the Magone project planning area would remain unbalanced with disturbance driven processes critical for creating quality fish habitat in particular being minimal. (See discussion of aquatic restoration effects Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis above and Table 94 below.)

The 2005 Final Rule for Travel Management; Designated Routes and Areas for Motor Vehicle Use (Travel Management Rule) requires national forests and ranger districts to designate those roads, trails, and areas that are open to motor vehicle use. The Malheur National Forest is not undertaking this process at this time. However, implementation in the future could restrict motorized travel to designated routes and restrict motorized cross-country travel. Implementation of this Rule on the Forest would reduce negative impacts to aquatic species and habitat associated with motorized travel within RHCAs.

Currently, invasive plants on the Forest may only be treated mechanically, therefore, without herbicides; there would likely be cumulative effects on aquatic species due to habitat degradation along stream banks, in particular spotted knapweed. Treatment of invasive plant infestations are authorized in the Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015b). Future treatment of these infestations would cumulatively result in fewer invasive plants and thus less impact to riparian areas and aquatic habitats.

### 3.8.2.4 Alternative 2 – Proposed Action

#### *Design Criteria and Mitigation Measures*

The following project design criteria and mitigation measures are included in Appendix C – Project Design Criteria. These measures have been found to be highly effective at minimizing any negative effects of projects similar to the Magone Project on TES species and their habitats.

- General Water Drafting Guidance for Road Maintenance and Non-emergency Fire Use for Watersheds with Anadromous Fish in the Blue Mountain Tri-Forest Area.
- National Marine Fisheries Service Juvenile Fish Screen Criteria for Pump Intakes.
- Relevant project implementation criteria for road maintenance activities as included in the 2010 Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation for Malheur National Forest Road Maintenance Activities 2010–2015.
- Best management practices selected for project implementation.
- Magone Project design criteria (PDCs) relevant to aquatics.
- Aquatic Restoration Biological Opinion (ARBO II)(USDI FWS 2013a) and Malheur National Forest Aquatic Restoration Decision PDCs.
- Central Oregon Trail Alliance (COTA) Trail standards.

#### *Proposed Action Project Elements*

For the purposes of this analysis, the component parts of the proposed action are organized into the following project elements shown below:

- Timber felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)
- Fuels treatments (includes prescribed burning, piling/burning, and biomass removal)
- Temporary roads and landings
- Stream crossings
- Road decommissioning and road closures
- Road maintenance and use (includes haul and water drafting)
- Recreational trails and interpretive signage
- North side Magone Lake day use area
- Recreational boat docks and fishing dock installation

- Magone Lake fish habitat improvement (fish sticks and fish cribs)

Descriptions and tables regarding proximity of project elements to aquatic resources are stated in only the first of the six primary habitat elements below (pool frequency) for brevity. The analysis of effect for the other five primary habitat elements references the summary tables included under pool frequency for the project element metrics.

### *Direct and Indirect Effects*

**Direct and Indirect Effects – Pool Frequency**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – Timber felling activities would occur outside of RHCAs under alternative 2, therefore no meaningfully measureable effects to pool frequency are expected.

Approximately 18 acres of conifer reduction within adjoining upland aspen stands outside of RHCAs would occur in alternative 2. Aspen restoration activities involve non-commercial thinning of conifers extending up to 100 feet outside of 7 upland aspen stands to encourage expansion of the stands through a reduction in competition for light and water. Smaller diameter trees and slash from larger trees would be cut, handpiled and burned, or left on the ground to provide a protective barrier to ungulate grazing. Fences would also be constructed around aspen stands to reduce livestock grazing pressure.

Aspen restoration treatments would not likely result in adverse impacts to existing and future pool habitat due to the small scale of treatments and location within upland sites. The reduction in stocking densities following treatments would increase new growth of aspen and the vigor of larger aspen in the overstory.

Felling of danger trees for human safety along haul routes in RHCAs has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCAs when they pose a safety risk (PACFISH Standard RA-2). Danger trees felled within or into RHCAs would be felled into the stream where feasible or otherwise left within the RHCA. Felling of trees for road construction also has the potential to reduce the supply of LWD to stream channels and therefore pool habitat; however, these trees would be treated in the same manner as danger trees as described above and all road construction within RHCAs would occur on existing road beds, requiring minimal tree removal to bring roads to a useable state. Where trees are felled into the stream, they may create pools.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to fisheries resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other hardwoods, and increasing the canopy base height. Biomass removal, piling/burning, and post and pole removal would not occur within Category 1 and 2 RHCAs under alternative 2.

Most prescribed burning would mimic low intensity fires that create a mosaic pattern of burned and unburned landscape that are characteristic of natural burning patterns that tend to occur in riparian areas.

Low intensity underburning would be scheduled to occur after any planned mechanical treatments are completed. Initial underburning would typically occur in the spring when duff and large logs are still moist, so that only a portion of the buildup of ground fuels is consumed by the first burn. Subsequent burns would occur under dryer, fall-like conditions. Fireline construction is not anticipated in RHCAs; however, firelines would be rehabilitated after use if construction were deemed necessary. Using these techniques, mortality of understory trees would occur in burned patches but few overstory trees would be killed. Methods would be implemented as described in the fuels section to protect large trees, prevent fire intensities that would be high enough to consume trees or downed wood large enough to function as LWD in stream channels, and retain at least 90 percent of the shrub and tree shade directly shading perennial streams.

Burning activities would not result in delivery of fine sediment to stream channels sufficient to result in a meaningfully measureable reduction of pool habitat. The reduction in stocking densities following burning activities would also increase the vigor of larger trees in the overstory for future LWD to create pools; this effect would be positive and meaningfully measureable.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 2 (Table 70). Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future pool habitat. Approximately 0.8 miles of temporary road construction are proposed within 100 feet of Category 4 RHCAs (Table 75). Most temporary roads would have a discountable effect to fisheries resources due to one or more of the following: road location would 1) be outside of RHCAs; 2) be on Category 4 RHCAs more than 100 feet from stream channels; 3) be within 100 feet from stream channels but on existing road beds requiring minimal disturbance to bring to a useable state; 4) cross Category 4 streams over 0.18 miles upstream of fish-bearing streams. No temporary road construction is proposed within in MCR steelhead critical habitat or Category 1 and 2 RHCAs within alternative 2.

**Table 70. Alternative 2 temporary roads/closed to open roads within 100 feet of Mid-Columbia River (MCR) steelhead critical habitat**

| Road type | Miles within MCR steelhead critical habitat (100 feet) |
|---|---|
| Closed to open road | 0.11 Tinker Creek |
| Temporary road | 0 |

Temporary or closed to open road entire segment lengths that may impact aquatic species habitat include the following:

- 5 temporary road crossings of Category 4 RHCAs occur within alternative 2.
- 2 crossings of native surface roads occur within alternative 2 on Tinker Creek and East Fork Beech Creek in MCR steelhead critical habitat.
- 4 crossings on native surface road within Category 1 and 2 RHCAs in alternative 2
- 45 crossings of category 4 RHCAs

With implementation of stream crossing PDCs (see log haul PDCs in Appendix C – Project Design Criteria), construction of these temporary roads would have a negative but not meaningfully measureable effect for pool frequency. Stream crossings within MCR steelhead critical habitat and RHCA categories are summarized by road surface type in Table 71 below. Effects related to pool frequency for stream crossing improvements (not culvert replacement) are discussed below.

Effects on sediment and pool frequency related to culvert replacement or removal are discussed under foreseeable aquatic restoration actions in conjunction with Magone project actions effects on the six primary habitat elements above.

**Stream Crossings and Improvements** – There are 7 stream crossings on MCR steelhead critical habitat; 2 crossings are on asphalt, 3 are on crushed aggregate, and 2 are on native surface (Table 71). Within Category 1, 2, and 4 RHCAs in the project planning area there are a total of 12 crossings on asphalt, 25 on crushed aggregate, and 45 on native surface. Road status for the stream crossings within each RHCA category for alternative 2 are summarized in Table 70 above. Crossings on native surface roads may contribute sediment to stream channels but with implementation of BMPs and PDCs related to rocking of road crossings and appropriate drainage features a reduction in pool frequency due to sediment inputs is not likely to occur.

There is a short-term risk of mobilizing and/or delivering sediment to streams during and shortly after stream crossing improvement activities. Bare soil is prone to erosion and can result in fine sediment entering stream channels and resultant increases in turbidity. Habitat impacts are likely to include areas of exposed streambank in isolated locations primarily in the vicinity of stream crossings. Exposed areas and other disturbances that occur are likely to result in a slight increase in turbidity for a short distance downstream during rainstorms or runoff events. However, given background levels of turbidity during runoff events it would be difficult to distinguish between turbidity resulting from this project activity and background turbidity. An unknown amount of sediment would be mobilized into streams. Timing of work outside of the wet season and adherence to all PDCs and BMPs would further limit fine sediment delivery. A slight increase in fine sediment deposition within pools for a short distance downstream of exposed and disturbed areas is also likely to occur. Because of the small amount of fine sediment expected and the vegetated buffer between the road prism and stream a negative but not meaningfully measurable effect is expected for pool frequency.

Stream crossing improvement activities (not culvert replacement) would also have a positive but not meaningfully measurable effect on pool frequency due to a lasting but minor decrease in fine sediment delivery to streams as a result of installing the appropriate drainage features and road surface within RHCAs and stream crossings.

Stream crossings on native surface roads may contribute sediment to stream channels resulting in a negative but not meaningfully measurable effect for fine sediment and embeddedness. Designs would consider utilizing dips, outsloping, insloping with a ditch-relief culvert, and/or erosion control on vegetative buffers (slash from roadside brushing, revegetation, coir logs[14], etc.) in addition to rocking. Implementation of BMPs and PDCs related to these crossings and appropriate drainage features would result in a beneficial effect that is not meaningfully measurable for pool frequency.

**Table 71. Alternative 2 stream crossings by road surface type, Mid-Columbia River (MCR) steelhead critical habitat**

| MCR steelhead critical habitat | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Streams crossed | 2 streams<br>Grub Creek,<br>Tinker Creek | 3 streams<br>EF Beech Creek,<br>Tinker Creek,<br>Clear Creek | 2 streams<br>Tinker Creek,<br>EF Beech Creek | 0 |

[14] Coir logs are constructed of biodegradable materials and used for slope and stream bank stabilization.

**Table 72. Alternative 2 road surface and number of stream crossings by riparian habitat conservation area (RHCA) category**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 | 5 | 2 | 0 |
| Category 2 | 3 | 8 | 2 | 0 |
| Category 4 | 6 | 12 | 41 | 5 |
| **Total** | **12** | **25** | **45** | **5** |

**Table 73. Alternative 2 haul route road surface, route designation, and stream crossings within riparian habitat conservation area (RHCA) category**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 crossings (open FS and County roads) | 5 crossings (open FS and County roads) | 2 crossings (1 open FS road and 1 closed to open FS road) | 0 |
| Category 2 | 3 crossings (open FS and County roads) | 8 crossings (open FS and County roads) | 2 crossings (2 open FS roads and 1 closed to open FS road) | 0 |
| Category 4 | 6 crossings (open FS and County roads) | 12 crossings (open FS and County roads) | 41 Crossings (12 open FS roads and 29 closed to open FS roads) | 5 |
| **Total** | **12** | **25** | **45** | **5** |

**Road Decommissioning and Road Closure** – A total of 0.3 miles (1 segment of road) are proposed for decommissioning and 1.1 miles of road (4 road segments) are proposed for closure, 1.4 miles (2 road segments) of currently open road are proposed for co-designation as a trail and ML 1 road. The table below summarizes the miles of road within 100 feet of RHCA Categories 1, 2, and 4 proposed for decommissioning or closure.

Approximately 0.32 miles of road decommissioning (Table 74) would occur on 1 segments of road within alternative 2. The decommissioned segment within a category 4 RHCAs occurs on Grub Creek approximately 1 mile above MCR steelhead critical habitat. Road segments that would be closed occur on East Fork Beech Creek and unnamed tributaries to East Fork Beech Creek, and Clear Creek above MCR steelhead critical habitat.

**Table 74. Alternative 2 miles of decommissioned road and closed road segments with riparian habitat conservation area (RHCA) categories**

| Road changes within 100 feet of RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Decommissioning | 0 | 0 | 0.3 |
| Close road | 0.03 | 0.06 | 0.20 |

Approximately 0.30 miles of open roads would be closed under alternative 2 within Category 1, 2, and 4 RHCAs (Table 74). Closed roads are those roads on which motorized traffic has been excluded by regulation, barricade blockage, or by obscuring the entrance. A closed road is an operating facility on which motorized traffic has been removed (year-long or seasonal) and remains on the Forest Road Transportation System. Roads would be closed using gates or signs. Closed roads would be left in a stable condition and maintained.

One segment of road would be closed in the Category 1 RHCA (0.02 miles) of Clear Creek below the uppermost limit of fish distribution. There is one crossing and road segment identified for decommissioning (0.3miles) within Category 4 RHCA of Grub Creek. Closure and decommissioning of the road segments would likely reduce delivery of fine sediment to Clear Creek and Grub Creek from road use. The reduction in sediment would result in a positive but not meaningfully measureable change to pool frequency within TES/MIS species habitat. However, the potential for increase in LWD recruitment due to road decommissioning would likely result in a positive and meaningfully measurable increase in pool frequency in the long term.

Four segments of roads within 100 feet would also be closed in Category 4 RHCAs totaling approximately 0.2 miles; these road segments are on tributaries to fish-bearing portions of Clear Creek and East Fork Beech Creek.

One segment of road within 100 feet would be decommissioned in Category 4 RHCAs totaling approximately 0.3 miles within Grub Creek.

Closure of these road segments would likely result in a measurable reduction in sediment delivery to subject streams, but would not be of sufficient magnitude to result in a meaningfully measurable change in pool frequency.

Road closure actions include construction of drainage structures that would be self-maintaining after closure. Closure of these roads poses a negligible risk of sedimentation to fish-bearing streams because dry land “filtration” lies between the closure sites and any streams, and the amount of land disturbed during gate construction is too small and too flat to produce significant sediment. However, since these roads would remain part of the forest road system, the benefits of the closures would likely not be “permanent.” Because of the low risk of sedimentation from road closures and reduction in vehicle travel resulting in vegetation covering the roadbed, filling of pools and a reduction in pool frequency is expected to be positive but not meaningfully measurable

Decommissioning activities result in the removal of a road from the permanent transportation system of the Forest. The impacts of the road on the environment are eliminated or reduced to an acceptable level; the goal is to leave the road in a “hydrologically disconnected” state and convert the former roadway to other resource use. Decommissioning includes restoring hydrologic function by re-contouring, subsoiling, and scarification of the surface. Watershed design criteria identify specific measures for decommissioning.

The National Forest Management Act requires “re-establishing vegetative cover” on decommissioned roads within 10 years {16 USC 1608(b)}. To accomplish this, the roadbed would be covered with natural materials such as logs, rocks, slash, and brush for a distance deemed to prohibit motor vehicle use; re-contouring, ripping/subsoiling, and seeding would occur as necessary; roads decommissioned within RHCAs would also be planted with conifers to maintain vegetation establishment and growth. Vegetation would be re-established as well via seeding and planting of conifers and hardwoods.

Road decommissioning activities would not include removal of trees that could function as LWD in stream channels, nor result in delivery of sediment to streams to a degree that pools are filled; therefore, reductions in existing pool habitat would be negligible. Conifers would be planted in decommissioned road segments in RHCAs as part of the decommissioning process. Further, LWD would be added to streams adjacent to decommissioned roads (see LWD discussion below). Restoration of floodplain connectivity and stream channel complexity through road decommissioning, LWD additions, and revegetation activities would restore stream process and function, and result in a long-term increase in pool frequency. Restoration of LWD recruitment processes on the sides of streams where roads previously occurred would increase and maintain LWD recruitment, resulting in an increase in pool frequency in the long-term (70 to 100 years).The long-term effects are expected to be positive and meaningfully measurable.

**Road Maintenance and Use (includes haul, water drafting)** – Approximately 78 road segments totaling 77.7 miles are scheduled for haul maintenance within alternative 2. Table 75 summarizes these miles by road activity type and road surface type, within 100 feet of RHCA categories.

**Table 75. Alternative 2 miles of road type and road surface within 100 feet of Category 1, 2, and 4 riparian habitat conservation areas (RHCAs)**

| Roads within 100 feet of RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Miles | 7.07 | 1.93 | 5.91 |
| **Road type within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Closed to open Forest Service road | 0.35 | 0.03 | 2.69 |
| Open County road | 1.93 | 0.25 | 0.36 |
| Open Forest Service road | 4.77 | 1.65 | 2.14 |
| Temporary road | 0 | 0 | 0.72 |
| **Total miles** | **7.05** | **1.93** | **5.91** |
| **Road surface within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Asphalt | 0.46 | 0.65 | 0.43 |
| Crushed aggregate or gravel | 5.96 | 1 | 0.26 |
| Native material | 0.59 | 0.20 | 4.7 |
| Temporary | 0 | 0 | 0.37 |
| Improved native material | 0 | 0.09 | 0.14 |
| **Total miles** | **7.01** | **1.93** | **5.91** |

**Table 76. Alternative 2 miles of road type and surface type for haul within 100 feet of Mid-Columbia River steelhead critical habitat (2.93 miles total)**

| Road type | Asphalt | Crushed aggregate | Native material |
|---|---|---|---|
| Closed to open Forest Service road | 0 | 0 | 0.11 |
| Open County road | 0.28 | 0.82 | |
| Open Forest Service road | 0.13 | 1.49 | 0.10 |
| Temporary road | 0 | 0 | 0 |
| **Total miles** | **0.41** | **2.31** | **0.21** |

Approximately 15 miles of haul routes and road maintenance would occur in Category 1, 2, and 4 RHCAs; approximately 7 miles of these activities would occur within 100 feet of Category 1 RHCA streams (Table 75 and Table 76). Road maintenance would occur on all haul routes. With implementation of PDCs, delivery of fine sediment resulting from road maintenance and use would not be of sufficient magnitude to result in a meaningfully measureable reduction in pool frequency.

Water withdrawals for dust abatement during haul activities would occur. Water withdrawals would be in accordance with the PDCs, including National Marine Fisheries Service guidance. Use of these PDCs would insure that water withdrawals do not result in a reduction in pool habitat that is meaningfully measurable.

**Recreation Trail Construction and Interpretive Signage** – In alternative 2, 48.8 miles of trail are proposed with 40.7 miles of new trail construction. A total of 14.8 miles of these trails are within the Nipple Butte IRA (Table 77). The miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat as well as the number of stream crossings are summarized in Table 77. With implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a neutral effect to pool frequency from this proposed activity. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

Interpretive signage along the north side of Magone Lake may be within 50 feet of the shoreline; however, a minimal amount of ground disturbance to place 4 by 4 posts for mounting signs, with no felling of shade trees, would result in no effect to pool frequency.

**Table 77. Alternative 2 trails—number of stream crossings in riparian habitat conservation areas (RHCAs) and Mid-Columbia River (MCR) steelhead critical habitat, and miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat**

| Proposed trail | Miles of trail |
|---|---|
| Total proposed trails | 48.8 |
| New construction | 40.7 |
| Within Nipple Butte Inventoried Roadless Area | 14.8 |
| **Stream designation** | **Number of stream crossings** |
| Category 1 RHCA | 7 |
| Category 2 RHCA | 9 |
| Category 4 RHCA | 18 |
| Mid-Columbia River steelhead critical habitat | 4 |
| **Stream designation** | **Miles of trail within 100 feet of RHCA and MCR steelhead critical habitat** |
| Category 1 RHCA | 1.28 |
| Category 2 RHCA | 0.95 |
| Category 4 RHCA | 0.96 |
| Mid-Columbia River steelhead critical habitat | 0.41 |

**Day Use Area North side Magone Lake** – Approximately 0.2 miles of existing trail on the north side of Magone Lake would be improved to meet standards for accessibility. The new day use and picnic area would be placed more than 50 feet from the shoreline on a level surface. No clearing of trees or vegetation is expected to occur. Some shoreline trampling of vegetation may occur by the public accessing the lake. No fishing dock for lake access is proposed for alternative 2. These effects are expected to be minimal and no effect to pool frequency is expected with implementation of specific PDCs (see Appendix C – Project Design Criteria and the Watershed Report for recreation development).

**Fish Cribs and Fish Sticks** – In alternative 2, 15–20 fish cribs and 70–100 fish sticks in clusters of 5 to 7 trees would be placed on the east side of Magone Lake for fish and wildlife habitat improvement. Since the fish sticks and cribs are within Magone Lake, which was formed from a landslide that blocks connection to any downstream portions of Lake Creek, no meaningfully measurable change to pool frequency is expected. Additionally, work for fish cribs and fish sticks is proposed to be carried out over snow and frozen conditions reducing any likelihood of sediment being added to the lake. Therefore, no effect to pool frequency within Lake Creek downstream of Magone Lake is expected.

**Day Use Boat Dock, Campground Boat Mooring** – The day use boat dock and campground boat mooring are within Magone Lake, therefore they would not have an effect on pool frequency.

### Direct and Indirect Effects – Water Temperature and Stream Shading

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – All timber felling activities would occur outside Category 1 and 2 RHCAs under alternative 2, therefore no meaningfully measureable effects to water temperature and stream shading are expected.

Skyline yarding removal of shade-providing trees would be limited in size and frequency. All skyline yarding units were designed to yard uphill, and because no skyline units are within RHCAs, the need to yard across streams is unlikely. Tailholds[15] are needed for each skyline corridor that may cross streams. Yarding corridors 12 feet in width and a minimum 100 feet apart are highly unlikely to cause increased solar radiation and warming of surface waters. Usually no trees need to be felled; however, some limbing may be needed within RHCAs. Tailhold trees are typically located outside RHCAs. Further, the majority of shade-providing trees removed adjacent to streams occur along intermittent streams, reducing the likelihood that removal of these trees would result in a change in water temperature because intermittent streams go dry before water temperatures in aquatic TES/MIS habitat downstream becomes limiting to fish. No measureable stream heating from solar radiation is anticipated and water temperatures would be maintained; therefore, the probability that stream temperatures would increase from these activities is discountable at the site and reach scale.

Approximately 18 acres of conifer reduction within upland aspen stands outside of RHCAs would occur in alternative 2. Aspen restoration activities involve non-commercial thinning of conifers up to 100 feet outside of 7 aspen stands to encourage expansion of the stands through a reduction in competition for light and water. Smaller diameter trees and slash from larger trees would be cut, handpiled and burned, or left on the ground to provide a protective barrier to ungulate grazing. Fences would also be constructed around aspen stands to reduce livestock grazing pressure. Because these aspen units are within upland sites, no effect to pool frequency is expected.

Felling of danger trees may occur along roughly 8 miles of haul routes that are within 100 feet of Category 1 RHCA streams, and previous field observations suggest 1 to 2 trees per mile may be felled for a total of 8 to 16 trees over 8 miles. Danger trees are usually dead and provide little shade especially when surrounded by live trees; considering this as well as the minimal number of danger trees anticipated to be felled, measurable increases in stream temperatures would not likely result from proposed danger tree felling. Additionally, danger trees felled within or into RHCAs would be felled into the stream where feasible or otherwise left within the RHCA. Conifers felled into streams would immediately shade a minor portion of the stream, as well as provide sheltered sites for riparian hardwood growth through reduction of browse by herbivores, which would enhance stream shading in the long-term. See Watershed Report for additional analysis regarding the effects of the proposed action on stream temperatures.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to aquatic resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other riparian hardwoods, and increasing the canopy base height.

Burn prescriptions and PDCs would give the burn personnel a high degree of control over the burn intensities within the RHCAs to maintain the majority of the burn at a low intensity to minimize the severity on soils and riparian vegetation. These techniques would result in a patchy distribution of burned and unburned areas in RHCAs based on the Forest's experience with past prescribed burning activities in RHCAs using the same technique. Best management practices (BMPs) for low-intensity burning include retention of at least 90 percent of stream shade. The prescribed burning would occur when moisture and climate conditions would minimize the potential for a high intensity burn.

[15] Tailhold: A sturdy stump or tree used to support a block through which a cable runs back to a yarder.

With a low intensity burn, very little shade-providing stream vegetation is expected to be consumed under the more moist conditions encountered in riparian areas associated with perennial streams. In a recent study, Beche et al. (2005) found that a fall prescribed fire within the riparian zone of a mixed-conifer forest in El Dorado County, California, was patchy in terms of intensity, consumption, and severity. Additionally they found that although 49.4 percent of all tagged trees (>11.5 centimeters/4.5 inches) and snags were scorched by the prescribed fire, only 4.4 percent of all tagged trees were dead one year after the prescribed fire. In general, the trees killed by the prescribed fire were small and located near areas of high litter accumulation (Beche et al. 2005). It is not expected there would be loss of shade from low-intensity burns, but if there were, it would be less than 10 percent, which is not enough to affect stream temperature. Invigoration of riparian hardwoods because of prescribed burning is expected to result in a positive and meaningfully measurable effect for shade and water temperature.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 2. Limiting these activities to areas outside RHCAs would prevent adverse impacts to existing water temperature and shade. Most temporary roads would have a discountable effect to fisheries resources (see discussion under pool frequency). No temporary road construction occurs within category 1 and 2 RHCAs within alternative 2. Sites requiring removal of shade-providing trees for temporary road construction are limited in size and frequency, and the majority of shade-providing trees removed adjacent to streams occur along intermittent streams, reducing the likelihood that removal of these trees would result in a change in water temperature. Because intermittent streams go dry before water temperatures in occupied TES/MIS habitat downstream become limiting to fish, the removal of shade associated with construction of temporary roads would not have a negative and meaningfully measureable effect to stream shading and water temperature.

*Stream Crossings and Improvements* – Stream crossing activities may involve removal of trees and other shading vegetation; however, these activities would not likely result in a measureable increase in water temperature due to the small disturbance footprint and well-developed canopy of shade-producing trees in the vicinity of the crossings where tree removal would occur. There would be no removal of riparian hardwood adjacent to the stream channel. Additionally, any trees removed for stream crossing improvement would be utilized within the stream channel.

There is a short-term risk of removal of shade to streams during, and shortly after, stream crossing improvement activities. Trees within the stream crossing vicinity are often immature because of culvert installation during previous road work. Work related to stream crossing improvements would occur primarily on top of the road prism and would not require removal of shrubs adjacent to the stream. Adherence to all PDCs and BMPs would further limit impacts to shade. A slight decrease in shade within localized small areas at stream crossings would result in a negative but not meaningfully measurable effect to shade, but no measurable increase in water temperature is anticipated.

**Road Decommissioning and Road Closure** – Road decommissioning and road closure actions would not have any immediate effect on shade. Removal of danger trees in RHCAs for decommissioning activities is not anticipated. Conifers and native riparian hardwoods would be planted in decommissioned road segments as part of the decommissioning process. Over the long-term (50 to 70 years) shading would increase beyond baseline as planted conifers become established and grow to a size that provides shading. A positive and meaningfully measurable effect on shade is expected for road decommissioning in the long-term.

Road closure actions include construction of drainage structures that would be self-maintaining after closure. Closure of these roads poses a negligible risk for shade to fish-bearing streams since these closed roads may be open again and trees would not likely grow of a sufficient size within the roadbed to provide shade. However, since these roads are being kept as part of the forest road system, the benefits of shade from these closures would likely not be "permanent." A positive but not meaningfully measurable effect to shade from road closures is expected.

**Road Maintenance and Use (includes haul, water drafting)** – Road maintenance and haul may require the felling of hazard trees adjacent to streams that would have a negative but not meaningfully measurable effect to stream shading but because of the localized areas where this may occur no measurable increase in water temperatures is expected. Water withdrawals for dust abatement during haul activities would occur. Water drafting can occur only as long as supply is adequate to provide for both fish and withdrawal. The maximum withdrawal from one site in an 8-hour period would be 18,000 gallons of water. Water withdrawals would be in accordance with the criteria described in the 2010 Malheur National Forest Road Maintenance Biological Assessment and National Marine Fisheries Service guidance, included as Appendix C – Project Design Criteria. Use of these criteria would insure that water withdrawals do not result in a measurable increase in water temperatures.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within 100 feet and stream crossings within Category 1, 2, and 4 RHCAs is the same as those discussed under pool frequency. No felling of primary shade trees or LWD within 100 feet of the stream channel is expected. With implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a neutral effect to shade and water temperature from this proposed activity. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

Interpretive signage along the north side of Magone Lake may be within 50 feet of the shoreline; however, a minimal amount of ground disturbance to place 4 by 4 posts for mounting signs with no felling of shade trees would result in no effect to shading or temperature for Magone Lake.

**Day Use Area North side Magone Lake** – Approximately 0.2 miles of existing trail on the north side of Magone Lake would be improved to meet accessibility standards. The new day use and picnic area would be placed more than 50 feet from the shoreline and on level surface. No clearing of trees or vegetation is expected to occur. However, if some large trees are felled to improve the existing trail, and placed within the lake, this may have a negative but not meaningfully measurable effect on shade and temperature (due to minimal amount of trees being felled). Some shoreline trampling of vegetation may occur by the public accessing the lake, resulting in a negative but not meaningfully measurable effect for shade-providing riparian hardwoods. No fishing dock for lake access is proposed for alternative 2. These effects are expected to be minimal, and with implementation of specific PDCs (see Appendix C – Project Design Criteria and the Watershed Report and section) no effect to shading or water temperature is expected if trees are not felled for trail improvement and day use area construction.

**Fish Cribs and Fish Sticks** – In alternative 2, 15–20 fish cribs and 70–100 fish sticks in clusters of 5 to 7 trees would be placed on the east side of Magone Lake for fish and wildlife habitat improvement. Material for fish sticks and fish cribs would consist of smaller diameter trees obtained greater than 50 feet from the shoreline. Primary shade trees along the shoreline would not be utilized for material. Because the trees would be obtained outside of the primary shade zone no meaningfully measurable change to shade or water temperature is expected.

However, placement of fish sticks would create overhead cover that would be positive but not meaningfully measurable for shade within Magone Lake.

**Day Use Boat Dock, Campground Boat Mooring** – The day use boat dock and campground boat mooring would not require any felling or removal of trees adjacent to the shoreline of the lake. Therefore no effect to shade or water temperature is expected.

**Direct and Indirect Effects – Large Woody Debris**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 2, therefore no meaningfully measureable effects to LWD are expected from silviculture prescriptions.

Trees felled within or into RHCAs would be felled into the stream where feasible and left within the RHCA. Conifers felled into streams would immediately provide LWD. Accelerated growth of remaining conifers in response to thinning of overstocked stands would contribute to restoration of recruitment LWD. Short- and long-term effects to LWD would be positive but not meaningfully measurable due to the localized and limited number of trees that may be felled related to danger tree felling.

Skyline yarding removal of trees that could function as LWD would be limited in size and frequency. All skyline yarding units were designed to yard uphill, and since no skyline units are within RHCAs, the need to yard across streams is unlikely. Tailholds are needed for each skyline corridor, which may cross streams. Usually no trees need to be felled, and some limbing may be needed within RHCAs. Tailhold trees are typically outside RHCAs. Further, the majority of trees that could be removed adjacent to streams occur along intermittent streams, upstream of occupied habitat for TES species. Further, any trees needing felling would be felled into streams where feasible; where not feasible, it is usually because they lean away from the stream and would not have been recruited as LWD when falling under natural processes. Skyline yarding would have a negative effect on LWD that would not be meaningfully measureable.

Upland aspen restoration treatments would not likely result in negative and meaningfully measurable effects to LWD due to the small scale of treatments and their location outside of RHCAs. Reduction in stocking densities following treatments would increase new growth of aspen and the vigor of larger aspen in the overstory.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The majority of fuels treatment activities would occur outside of RHCAs. Where prescribed burning does occur within RHCAs, the majority would be low intensity fires, using techniques that would achieve mortality of understory trees in burned patches but few overstory trees would be killed. Methods would be implemented as described in the fuels section to protect large trees. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD in stream channels. The reduction in stocking densities following burning activities would increase the vigor of larger trees in the overstory. Consumption of coarse wood near stream channels greater than 4 inches DBH would be minimized. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams. Individual pieces or portions of LWD may be consumed in the prescribed fire but is not expected to result in a meaningfully measurable decrease in LWD.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 2. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future LWD. Most temporary roads would have a discountable effect to fisheries resources (see discussion under pool frequency above). Sites requiring the removal of trees that could be recruited as LWD for temporary road construction are limited in size and frequency, and the majority of trees removed adjacent to streams occur along intermittent streams, upstream of occupied habitat for TES/MIS species. Conifers would be felled into streams where feasible as described above. In most cases, trees that can safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Further, only a percentage of conifers removed would be close enough to the channel to provide LWD. Temporary road construction would have a negative effect on LWD that would not be meaningfully measurable.

**Stream Crossings and Improvements** – Stream crossing and improvement activities may involve removal of trees that could function as recruitment LWD; however, any trees requiring removal would be tipped and placed into streams to provide immediate LWD. These activities would have a positive effect on LWD by ensuring that any removed trees immediately provide the stream processes and functions of LWD, although due to the small scale of treatments, a slight meaningfully measureable effect is anticipated.

There is a short-term risk removal of LWD adjacent to streams during and shortly after stream crossing improvement activities that would be negative and not meaningfully measurable. Trees within the stream crossing vicinity are often immature due to installation of culverts from previous road work. Work related to stream crossing improvements would occur primarily on top of the road prism and would not require removal of shrubs adjacent to the stream. Adherence to all PDCs and BMPs would further limit impacts to LWD. All trees felled within the RHCA for stream crossing improvements would be used to improve drainage features and placed within the creek or adjacent RHCA. Because of the small extent of the area and the placement of any LWD within the stream crossings a positive but not meaningfully measurable effect is anticipated.

**Road Decommissioning and Road Closures** – Road decommissioning activities would not include removal of trees that could function as LWD in stream channels. Conifers would be planted in decommissioned road segments as part of the decommissioning process. Over the long-term (70 to 100 years) LWD recruitment processes would be restored on the sides of streams previously occupied by roads as planted conifers become established and trees that fall across the previous roaded area are no longer cut and removed for vehicle access. Further, LWD additions would occur in streams associated with road decommissioning therefore a positive and meaning measurable effect for LWD is expected.

Road closure actions include construction of drainage structures that would be self-maintaining after closure. Closure of these roads poses a negligible risk for LWD to fish-bearing streams since these closed roads may be open again therefore trees would not likely grow of a sufficient size within the roadbed to provide LWD. Firewood cutting within the RHCA may be reduced as a result of road closure. However, since these roads are being kept as part of the forest road system, the benefits to LWD from these closures would likely not be “permanent.” As a result, road closure is expected to have a positive but not meaningfully measurable effect on LWD.

**Road Maintenance and Use (includes haul, water drafting)** – Activities would not likely result in a reduction of LWD to Category 1, 2, or 4 RHCA stream channels because in most cases, trees that can only safely be felled across the road often have a lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Where conifers are felled into the stream, they would immediately function as LWD. The effects of this action would be negative for LWD but would not be meaningfully measurable.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within 100 feet and stream crossings within Category 1, 2 and 4 RHCAs is the same as those discussed under pool frequency. No felling of primary shade trees or LWD within 100 feet of the stream channel is expected. With implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a neutral effect to LWD from this proposed activity. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

Because interpretive signage along Magone Lake would not require the removal or felling of trees, no effect to LWD is expected.

**Day Use Area North Side Magone Lake** – Approximately 0.2 miles of existing trail on the north side of Magone Lake would be improved to meet accessibility standards. The new day use and picnic area would be placed more than 50 feet from the shoreline on a level surface. No clearing of trees or vegetation is expected to occur. However if these trees are felled within 50 feet of the lake shoreline then there could be a long-term negative and meaningfully measurable effect from the action on future LWD recruitment. Some shoreline trampling of vegetation may occur by the public accessing the lake. No fishing dock for lake access is proposed for alternative 2. These effects are expected to be minimal, and with implementation of specific PDCs (see Appendix C – Project Design Criteria and the Watershed Report) no effect to LWD is expected if trees are not felled for existing trail improvement and construction of new day use area.

**Fish Cribs and Fish Sticks** – In alternative 2, 15–20 fish cribs and 70–100 fish sticks in clusters of 5 to 7 trees would be placed on the east side of Magone Lake for fish and wildlife habitat improvement. Material for fish sticks and fish cribs would consist of smaller diameter trees obtained greater than 50 feet from the shoreline. The placement of fish stick and cribs within Magone Lake is expected to be beneficial and meaningfully measurable for LWD.

**Day Use Boat Dock, Campground Boat Mooring** – No felling of trees within 50 feet of the shoreline for placement of the day use boat dock and campground mooring expected therefore no effect LWD is expected.

**Direct and Indirect Effects – Embeddedness and Fine Sediment**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – Juniper treatments outside RHCAs, but immediately upslope (ridge top) of MCR steelhead critical habitat, would occur within the Nipple Butte IRA in alternative 2. The majority of these slopes are scablands that consist of limited herbaceous vegetation. PDCs in Appendix C – Project Design Criteria and the Watershed Report and section would minimize overland flow from precipitation events, thus reducing fine sediment transport. Additionally, the RHCA buffers would be adequate to capture any fine sediment that may be carried into the RHCA from upland treatments. The majority of timber felling activities would occur outside of RHCAs under alternative 2.

Because of the implementation of PDCs and BMPs regarding juniper treatments on scablands and the RHCA vegetative buffers, no meaningfully measureable effects to stream embeddedness and fine sediment are expected.

In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

Since proposed aspen restoration treatments and danger tree felling do not involve ground-disturbing activities, inputs of fine sediment are not expected to occur.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – Most fuels treatment activities would occur outside of RHCAs. Ignition of prescribed burns would occur outside RHCAs, allowing fire to back into RHCAs from upslope burning units. Ignition would also occur within some RHCAs, stopping within 25 feet of the stream channel. Most burning activities would mimic low intensity fires that are characteristic of natural burning patterns in riparian areas. Fireline construction is not anticipated in RHCAs; however, firelines would be rehabilitated after use if construction were deemed necessary. These techniques would result in a patchy distribution of burned and unburned areas in RHCAs. Using these techniques, fire intensities would not be high enough to consume downed wood that plays a role in trapping fine sediment. Some ground cover would be consumed but would be quickly replaced as litter fall occurs in the first year following burning and herbaceous plants recover in the second year following burning. A measurable increase in fine sediment in stream channels as a result of low severity burning activities is unlikely due to the combination of a patchy, low intensity burn in RHCAs, typical recovery of ground cover within 2 years of burning, and the low erosion potential for the subwatersheds.

Some moderate-severity burning would also occur in isolated patches with the objective of restoring and invigorating decadent riparian hardwood vegetation (deciduous trees and shrubs) where black hawthorn has become dominant. Black hawthorn is a native riparian shrub that has expanded considerably to form wide swaths in the project planning area due to limited palatability by livestock. The goal of the moderate-severity burn is to restore riparian shrub diversity. These actions would occur within RHCAs under the Aquatic Restoration Decision and ARBO II PDCs. Targeted moderate-severity burns associated with cottonwood, willow, and riparian hardwood treatments identified in the aquatic restoration cumulative effects table (Table 14) would occur in no more than an average 20 percent of the area within RHCAs per subwatershed per year. Such burns would be contained within the observable historical boundaries of the target riparian vegetation, plus any area needed to create controllable burn boundaries. Due to the minor extent of moderate severity burning activities and PDCs that would be implemented with this action, moderate severity prescribed burning would not result in delivery of fine sediment to stream channels sufficient to result in meaningfully measureable effects to embeddedness and fine sediment. As invigorated riparian vegetation growth following the reintroduction of fire occurs, fine sediment from upland sources would be filtered and stored in outer portions of RHCAs, resulting in a long-term beneficial effect to embeddedness and fine sediment that is meaningfully measureable.

Beche et al. (2005) conducted intense post-prescribed fire monitoring (e.g., pebble counts, longitudinal profiles, and cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005).

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 2. Limiting these ground-disturbing activities to areas outside of RHCAs along with erosion control BMPs, would prevent negative and meaningfully measurable impacts to embeddedness and fine sediment. PACFISH RHCA buffer widths were designed to provide an area to trap fine sediment generated from upslope activities such as timber harvest.

With implementation of PDCs and BMPs, construction of most temporary roads would not result in a meaningfully measureable increase in embeddedness and fine sediment.

Temporary road construction (including post-use rehabilitation) of the segment that comes to within 100 feet of a Category 2 stream channel in Clear Creek would likely result in creation and transport of a negligible amount of fine sediment to Clear Creek due to loosening of sediment particles and destruction of ground cover. No temporary road construction within Category 1 RHCAs or MCR steelhead critical habitat occurs within alternative 2 and therefore no effect to embeddedness and fine sediment is anticipated.

**Stream Crossings and Improvements** – There is a short-term risk of mobilizing and/or delivering sediment to streams during and shortly after haul and road crossing improvement activities. Bare soil is prone to erosion and can result in fine sediment entering stream channels and the resultant increases in turbidity. Habitat impacts are likely to include areas of exposed streambank in isolated locations primarily in the vicinity at stream crossings. Exposed areas and other disturbances that occur are likely to result in a slight increase in turbidity for a short distance downstream during rainstorms or runoff events. However, given background levels of turbidity during runoff events it would be difficult to distinguish between turbidity resulting from this project activity and background turbidity. An unknown amount of sediment would be mobilized into streams. Timing of work outside of the wet season and adherence to all PDCs and BMPs would further limit fine sediment delivery. A slight increase in fine sediment deposition for a short distance downstream of exposed and disturbed areas is also likely to occur but is not expected to be meaningfully measurable.

Design criteria include those identified in the Aquatic Restoration Biological Opinion (ARBO II) (USDI FWS 2013a) as well as design criteria developed by the Blue Mountain Ranger District interdisciplinary team. The ARBO PDCs specific to this project would be implemented as described in the ARBO and the Aquatic Restoration Decision. In addition, any Reasonable Prudent Measures and Terms & Conditions (RPMs and T&Cs) from Endangered Species Act section 7 consultation with National Marine Fisheries Service and the U.S. Fish and Wildlife Service are non-discretionary and must be implemented as part of the Magone Project to minimize the amount or extent of incidental take of steelhead. The RPMs and T&Cs are included in Appendix C – Project Design Criteria. The PDCs, RPMs, and T&Cs would reduce the probability and magnitude of this short-term risk. After about 2 years, effects of these activities are beneficial for water quality and fish habitat, including reduced sediment yield from the road prism.

Stream crossings on native surface roads may contribute sediment to stream channels resulting in a negative but not meaningfully measurable effect for fine sediment and embeddedness. Designs would consider utilizing dips, outsloping, insloping with a ditch-relief culvert, and/or erosion control on vegetative buffers (slash from roadside brushing, revegetation, coir logs, etc.) in addition to rocking. Implementation of BMPs and PDCs related to these crossings, and appropriate drainage features, would result in a positive effect that is meaningfully measurable for degraded road crossings and road drainage features.

**Road Decommissioning and Road Closure** – The procedure for decommissioning a road would include removing all culverts and reshaping the immediate area. In addition, cross ditches would be constructed to maintain drainage and reduce the potential for surface erosion. These measures would be implemented during decommissioning to “hydrologically disconnect” roads from streams, to reduce sediment entering streams and affecting fish habitat.

There is a short-term risk of generating sediment during and shortly after decommissioning activities that could reach streams, primarily in the vicinity of stream crossings where culvert removal, scarification, or subsoiling is needed to discourage vehicle use and improve infiltration. Bare soil is prone to erosion and can result in fine sediment entering stream channels and the resultant increases in turbidity. Habitat impacts are likely to include areas of exposed streambank in isolated locations primarily in the vicinity of stream crossings. Exposed areas and other disturbances that occur are likely to result in a slight increase in turbidity for a short distance downstream during rainstorms or runoff events. However, given background levels of turbidity during runoff events it would be difficult to distinguish between turbidity resulting from this project activity and background turbidity. An unknown amount of sediment would be mobilized into streams. Timing of work outside of the wet season and adherence to all PDCs and BMPs would further limit fine sediment delivery. A slight increase in fine sediment deposition for a short distance downstream of exposed and disturbed areas is also likely to occur. There is the potential for fine sediment to slightly increase embeddedness within gravels suitable for spawning when the gravel is located immediately downstream from road decommissioning sites. Increased embeddedness may also result in a decrease in the potential for production of aquatic macroinvertebrates as discussed above. These impacts are expected to be localized and short-term. Consequently, the effect to embeddedness and fine sediment by road decommissioning is negative and expected to be measureable.

Road decommissioning would also have a positive and meaningfully measureable effect on embeddedness and fine sediment due to a lasting but minor decrease in fine sediment delivery to streams as a result of hydrologically disconnecting unneeded roads from the drainage system. Design criteria include those identified in the ARBO as well as design criteria developed by the Blue Mountain Ranger District interdisciplinary team. The ARBO PDCs specific to this project would be implemented as described in the ARBO. Implementation of the PDCs, as well as implementation of any Reasonable Prudent Measures and Terms & Conditions from Endangered Species Act section 7 consultation with National Marine Fisheries Service and the U.S. Fish and Wildlife Service (Appendix C – Project Design Criteria and Appendix B of the Aquatic Resources Report) would reduce the probability and magnitude of this short-term risk. After about 2 years, effects of road decommissioning are beneficial for water quality and fish habitat. The improved infiltration and ground cover condition of the decommissioned roads, as well as restoration of the energy-dissipating functions associated with floodplain connectivity, would help restore natural watershed function, including reduced sediment yield from the road prism.

Road closure actions include construction of drainage structures that would be self-maintaining after closure. Closure of these roads poses a negligible risk of sedimentation to fish-bearing streams since dry land "filtration" lies between the closure sites and any streams, and since the amount of land disturbed during gate construction is too small and too flat to produce significant sediment. However, since these roads are being kept as part of the forest road system, the benefits of the closures would likely not be “permanent.” Because of the low risk of sedimentation from road closures and reduction in vehicle travel resulting in vegetation covering the roadbed effects to embeddedness and fine sediment are expected to be positive but not meaningfully measurable due to the lack of permanency for closures.

**Road Maintenance and Use (includes haul, water drafting)** – Road maintenance would occur at a level commensurate with use, and would include several activities that may potentially result in sedimentation from the road prism to the ditch line or the adjacent slope. Typical road maintenance activities would blade and shape roads, including existing drainage dips, grade sags, and waterbars; repair damaged culverts and ditches; place rock in some existing drainage dips and grade sags; place rock in wet areas of road; remove brush and danger trees; and apply dust abatement. Roads crossing streams would be rocked for 100 feet on each side of the crossing where deemed appropriate based on inspection by a fish biologist, hydrologist, and engineer. Machinery would be kept on the road prism (see log haul PDCs in Appendix C – Project Design Criteria).

The longer term effects of road maintenance are to maintain or improve existing road conditions. Road maintenance may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance may occur on all or nearly all of the haul roads.

Proposed road maintenance and haul activities in RHCAs would likely result in creation and transport of a negligible amount of fine sediment to stream channels due to loosening of sediment particles and destruction of ground cover. However, PDCs would be implemented during these activities, and are expected to limit fine sediment delivery to streams, keeping amounts reaching stream channels to negligible levels for other than rare precipitation events (negative but not meaningfully measurable).

Water withdrawals for dust abatement during haul would be in accordance with the PDCs, including NMFS guidance. Use of PDCs for water drafting would ensure that water withdrawals do not result in significant delivery of fine sediment to streams.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within 100 feet and stream crossings within Category 1, 2, and 4 RHCAs is the same as those discussed under pool frequency for alternative 2. No felling of primary shade trees or LWD within 100 feet of the stream channel is expected. With implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a negative but not meaningfully measurable effect on embeddedness and fine sediment from this proposed activity. No interpretive sites or trailheads are within RHCA Categories 1, 2, or 4 or within MCR steelhead critical habitat.

Interpretive signage along Magone Lake would require minimal disturbance limited to inserting 4 by 4 posts into the ground for attaching signage. Due to the small scale of these disturbances, no effect related to embeddedness and fine sediment is expected from placing interpretive signs.

**Day Use Area North Side Magone Lake** – Approximately 0.2 miles of existing trail on the north side of Magone Lake would be improved to meet accessibility standards. The new day use and picnic area would be placed more than 50 feet from the shoreline and on level surface. No clearing of trees or vegetation is expected to occur. Some shoreline trampling of vegetation may occur by the public accessing the lake for recreational activities. No fishing dock for lake access is proposed for alternative 2.

These effects are expected to be minimal, and with implementation of specific PDCs (see Appendix C – Project Design Criteria and the Watershed Report and section), the effects for embeddedness and fine sediment are expected to be negative but not meaningfully measurable for fine sediment.

**Fish Cribs and Fish Sticks** – In alternative 2, 15–20 fish cribs and 70–100 Fish sticks in clusters of 5 to 7 trees would be placed on the east side of Magone Lake for fish and wildlife habitat improvement. Material for fish sticks and fish cribs would consist of smaller diameter trees obtained greater than 50 feet from the shoreline. Activities related to tree placement, tipping or felling would occur over snow or frozen ground during the winter. Trees for fish sticks would be slid out onto the ice and cribs would be constructed on top of the ice. A minor amount of fine sediment may be contained within the rootwads of trees that were tipped. The general practice of shaking the trees with equipment reduces soil attached to rootwad. Holes would be immediately filled where trees are removed. Implementation of PDCs regarding tree tipping and LWD stock piling contained within the Aquatic Restoration Decision. The effects for fine sediment and embeddedness are neutral and not meaningfully measurable.

**Day Use Boat Dock, Campground Boat Mooring** – There is a potential for a negligible amount of fine sediment to be washed into Magone Lake during precipitation events at the day use boat dock and campground dock boat mooring. Work for the day use boat dock would occur within the existing footprint of the current day use boat dock and the shoreline connection for the boat mooring dock would be hardened and appropriate drainage installed at the trail access point. With implementation of BMPs and PDCs a neutral effect for fine sediment and embeddedness is expected.

**Direct and Indirect Effects – Width-to-Depth Ratio and Streambank Stability**

Width-to-depth ratio and streambank stability indicators are grouped since they are affected similarly by PEs.

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – Most timber felling activities would have no effect on width-to-depth ratios or streambank stability due to proximity of most actions away from the stream channel and implementation of PDCs and BMPs. The possible minor amounts of sediment entering channels and small areas of bank instability would not affect width/depth ratios at the site or reach scale. Effects from these actions on width/depth ratios would be neutral.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – A minor short-term decrease in stream bank stability would occur as a result of prescribed burning activities in RHCAs until vegetation recovers. However, it is unlikely that burned patches along stream banks would be in sufficient sizes or quantity to result in a meaningfully measureable decrease in bank stability. These impacts would not be of a scale that would result in destabilization of stream channels, thus a neutral effect to width-to-depth ratios from fuels treatments is anticipated. Over the long-term as fire invigorates riparian shrub growth, bank stability would increase in a meaningfully measureable way. No effects to bank stability or width-to-depth ratios are expected from pile burning and biomass removal due to proximity of these activities away from stream channels.

**Temporary Roads and Landings** – No landings are proposed within Category 1, 2, and 4 RHCAs under alternative 2. No temporary road construction would occur within in Category 1 and 2 RHCAs or MCR steelhead critical habitat. Therefore No effect is anticipated to streambank stability or width to depth ratios.

**Stream Crossings and Improvements** – Currently many of the existing stream crossings contain under sized culverts within Category 1 and 2 RHCAs. These culverts facilitate bank instability downstream, interrupt sediment processing and may be fish passage barriers. Removal/replacement and log haul PDCs would address current bank stability and width-to-depth ratio issues at work sites, having long-term beneficial effects to stream processes and functions that extend well beyond those work sites. Effects from stream crossing improvements on width-to-depth ratios and bank stability would be positive and meaningfully measureable. (See Reasonably Foreseeable Aquatic Restoration Activities under Cumulative Effects section for description of culvert replacement and removal page 49 and Table 94 for effects on the 6 primary habitat elements.)

Stream crossing improvements on native surface roads may result in some bank instability below improvements in the short-term, and are expected to be negative but not meaningfully measurable Designs would consider utilizing dips, outsloping, insloping with a ditch-relief culvert, and/or erosion control on vegetative buffers (slash from roadside brushing, revegetation, coir logs, etc.) in addition to rocking. Implementation of BMPs and PDCs related to these crossings and appropriate drainage features would result in a beneficial effect that is meaningfully measurable for stream banks above and below drainage features.

**Road Decommissioning and Road closures** – Road decommissioning would positively affect bank stability and width-to-depth ratios by obliterating roads that restrict floodplain connectivity. The minor amount of sediment delivered to streams associated with road decommissioning would not affect width-to-depth ratios. Due to the extent and location of treatments, this effect would be positive and meaningfully measureable.

Road closure actions include construction of drainage structures that would be self-maintaining after closure. Closure of these roads poses a negligible risk for bank stability and a neutral effect for width-to-depth ratios to fish-bearing streams since dry land "filtration" lies between the closure sites and any streams, and since the amount of land disturbed during gate construction is too small and too flat to produce significant sediment. However, since these roads are being kept as part of the forest road system, the benefits of the closures would likely not be “permanent.” Because of the dryland filtration and distance from the stream, the effects to bank stability and width-to-depth ratio are expected to positive but not meaningfully measurable due to the lack of permanency for closures.

**Road Maintenance and Use (includes haul, water drafting)** – The possible minor amounts of sediment entering channels from road maintenance activities would not affect floodplain connectivity, streambank stability, or width-to-depth ratios at the site or reach scale. A neutral effect is anticipated.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within 100 feet and stream crossings within Category 1, 2, and 4 RHCAs is the same as those discussed under pool frequency for alternative 2. No felling of primary shade trees or LWD within 100 feet of the stream channel is expected. With implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a neutral effect to streambank stability and width-to-depth ratios from this proposed activity. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

**Day Use Area North Side Magone Lake** – Approximately 0.2 miles of existing trail on the north side of Magone Lake would be improved to meet accessibility standards. The new day use and picnic area would be placed more than 50 feet from the shoreline and on level surface. No clearing of trees or vegetation is expected to occur. Some shoreline trampling of vegetation may occur by the public accessing the Lake for recreational activities. No fishing dock for lake access is proposed for alternative 2. These effects are expected to be minimal, and with implementation of specific PDCs (see Appendix C – Project Design Criteria and the Watershed Report and section), the effects for bank stability are expected to be negative but not meaningfully measurable and width-to-depth ratios do not apply to Magone Lake.

**Fish Cribs and Fish Sticks** – In alternative 2, 15–20 fish cribs and 70–100 fish sticks in clusters of 5 to 7 trees would be placed on the east side of Magone Lake for fish and wildlife habitat improvement. Material for fish sticks and fish cribs would consist of smaller diameter trees obtained greater than 50 feet from the shoreline. Activities related to tree placement, tipping or felling would occur over snow or frozen ground during the winter. Trees for fish sticks would be slid out onto the ice and cribs would be constructed on top of the ice. Due to the work occurring on snow cover or frozen ground no effect to bank stability is expected and width-to-depth ratios do not apply to Magone Lake.

**Day Use Boat Dock, Campground Boat Mooring** – There is a potential for a negligible amount of bank instability to occur at the day use boat dock and campground dock boat mooring. Work for the day use boat dock would occur within the existing footprint of the current day use boat dock and the shoreline connection for the boat mooring dock would be hardened and appropriate drainage installed at the trail access point. With implementation of BMPs and PDCs a neutral effect for bank stability is expected.

### *Cumulative Effects*

Potential effects from alternative 2 would be cumulative with effects from non-federal activities within the project planning area and activities within the aquatic analysis area on federal, state, and private lands. Aside from this project, other non-restoration activities that may contribute to cumulative effects include; timber harvest activities, wildfires, livestock grazing, road use, flood irrigation/water diversion, and vegetation alteration.

The aquatic restoration actions covered under the Aquatic Restoration Decision would alleviate degraded conditions within RHCAs but would have short term adverse effects to several of the primary habitat elements but primarily fine sediment related to culvert replacement/removal, large and coarse wood placement, log weir and boulder modification, and prescribed fire. These actions directly address altered sediment transport regimes for scour and deposition and riparian vegetative structure resulting in long term benefits for all fish habitat elements. (See discussion of aquatic restoration effects under past, present, and foreseeable activities relevant to cumulative effects analysis above and Table 94 below.)

### 3.8.2.5 Alternative 3

*Direct and Indirect Effects*

**Direct and Indirect Effects – Pool Frequency**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The effects from silviculture prescriptions, yarding, and aspen restoration in alternative 3 are the same as alternative 2 with the exception of an increase in the units and acreage associated with silviculture prescriptions and associated activities (tractor and skyline). The intensity and scope of these effects increases incrementally from that of alternative 2 to alternative 3. The effects and scale of Juniper-conifer reduction treatments within the Nipple Butte IRA are the same as described in alternative 2 for pool frequency.

Felling activities would occur outside of RHCAs. Felling of danger trees for human safety along haul routes in RHCAs has the potential to reduce the supply of LWD to stream channels and therefore pool habitat. Under PACFISH, trees may be felled in RHCAs when they pose a safety risk (PACFISH Standard RA-2). Danger trees felled within or into RHCAs would be felled into the stream where feasible or otherwise left within the RHCA. Felling of trees for road construction also has the potential to reduce the supply of LWD to stream channels and therefore pool habitat; however, these trees would be treated in the same manner as danger trees as described above and all road construction within RHCAs would occur on existing road beds, requiring minimal tree removal to bring a road to a useable state. Where trees are felled into the stream, they may create pools.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The effects from fuels treatments for alternative 3 are the same as alternative 2 for pool frequency with the exception of an increase in the acres treated with grapple piling and hand piling. The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to fisheries resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other hardwoods, and increasing the canopy base height.

Prescribed burning would indirectly occur within RHCAs to help restore plant species composition and structure that would occur under natural fire regimes. Ignition would occur outside RHCAs, allowing fires to back into RHCAs from adjacent upslope areas. Ignition would also occur within some RHCAs using drip torches, stopping within 25 feet of the stream channel.

Most prescribed burning would mimic low-intensity fires that create a mosaic pattern of burned and unburned landscape that are characteristic of natural burning patterns that tend to occur in riparian areas.

Low-intensity underburning would be scheduled to occur after any planned mechanical treatments are completed. Initial underburning would typically occur in the spring when duff and large logs are still moist, so that only a portion of the buildup of ground fuels is consumed by the first burn. Subsequent burns would occur under dryer, fall-like conditions. Fireline construction is not anticipated in RHCAs; however, firelines would be rehabilitated after use if construction were deemed necessary. Using these techniques, mortality of understory trees would occur in burned patches but few overstory trees would be killed. Methods would be implemented as described in the Fuels section to protect large trees, prevent fire intensities that would be high enough to consume trees or downed wood large enough to function as LWD in stream channels, and retain at least 90 percent of the shrub and tree shade directly shading perennial streams.

Some moderate-severity burning would also occur in isolated patches with the objective of restoring and invigorating decadent riparian hardwood vegetation (deciduous trees and shrubs). Targeted moderate-severity burns associated with riparian enhancement and cottonwood, willow, and riparian hardwood aquatic restoration actions identified in the foreseeable aquatic actions table (Table 14) would occur in no more than an average 20 percent of the area within RHCAs per subwatershed per year. This PDC as specified in the ARBO would be easily achieved due to the minor spatial extent of proposed treatments relative to the RHCA network. Such burns would be contained within the observable historical boundaries of the target riparian vegetation, plus any area needed to create controllable burn boundaries.

Burning activities would not result in delivery of fine sediment to stream channels sufficient to result in a meaningfully measureable reduction of pool habitat. The reduction in stocking densities following burning activities would also increase the vigor of larger trees in the overstory for future LWD to create pools; this effect would be positive and meaningfully measureable.

No biomass removal activities would occur in RHCAs.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 3. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future pool habitat. Most temporary roads would have a discountable effect to fisheries resources due to one or more of the following: road location would 1) be outside of RHCAs; 2) be on Category 2 or 4 RHCAs more than 100 feet from stream channels; 3) be within 100 feet from stream channels but on existing road beds requiring minimal disturbance to bring to a useable state; 4) cross Category 2 streams over ½ mile upstream of fish distribution; 5) cross Category 4 streams over 0.18 miles upstream of fishbearing streams. Temporary roads that may impact aquatic species habitat include the following:

- 0.20-mile road segment (temporary road 29) is within Category 1 RHCA and MCR steelhead critical habitat (Tinker Creek) and a Category 4 RHCA. An existing decommissioned roadbed is present.
- 0.1-mile road segment (temporary road 6) is within Category 1 RHCA and MCR steelhead critical habitat (East Fork Beech Creek). No existing roadbed present.

**Table 78. Alternative 3 temporary roads within 100 feet of Mid-Columbia River (MCR) steelhead critical habitat (same as alternative 2)**

| Road type | Miles within MCR steelhead critical habitat (100 feet) native surface |
|---|---|
| Closed to open Forest Service road | 0.11 Tinker Creek |
| Temporary road | 0.30 Tinker Creek and EF Beech Creek |

Temporary road 29 is on an existing roadbed that is greater than 100 feet from the stream and temporary road 6 is separated from East Fork Beech Creek by a crushed gravel Forest Service road (Table 78) .With implementation of PDCs construction of this temporary road would result in a negative but not meaningfully measureable reduction in pool frequency. However, both of these roads are on relatively steep inclines increasing the risk associated with road failure and drainage issues (fine sediment).

**Stream Crossings and Improvements** – There are 7 stream crossings in MCR steelhead critical habitat; 2 are on asphalt, 3 are on crushed aggregate, and 2 are on native surface, which is the same as alternative 2. Within Category 1, 2, and 4 RHCAs in the project planning area there are a total of 12 crossings on asphalt, 25 on crushed aggregate, and 65 on native surface (Table 79). Road status for the crossings within each of RHCA categories for alternative 3 are summarized at the bottom of Table 79. The effects of native road surface crossings described within alternative 2 for alternative 3 have increased by an additional 16 native surface road crossings for haul within Category 2 and 4 RHCAs (closed to open roads) and 1 additional temporary road crossing. Stream crossings on native surface roads may contribute sediment to stream channels but with implementation of BMPs and PDCs related to rocking of road crossings and appropriate drainage features a reduction in pool frequency due to sediment inputs is not likely to occur. However, the risk associated with these crossings contributing sediment is increased and thus the risk of a reduction in pool frequency increases with the increase in native surface road crossings. Effects related stream crossing improvements are discussed under alternative 2 for pool frequency.

Stream crossings on native surface roads may contribute sediment to stream channels resulting in a negative but not meaningfully measurable effect for pool frequency. Designs would consider utilizing dips, outsloping, insloping with a ditch-relief culvert, and/or erosion control on vegetative buffers (slash from roadside brushing, revegetation, coir logs, etc.) in addition to rocking. Implementation of BMPs and PDCs related to these crossings, and appropriate drainage features, would result in a beneficial effect that is meaningfully measurable for degraded road crossings and road drainage features.

The effects of stream crossing improvements on pool frequency are the same as those described in alternative 2 but with a greater intensity due to the increase in roads within 100 feet of RHCAs and number of crossings.

**Table 79. Alternative 3 stream crossings by road surface type and Mid-Columbia River (MCR) steelhead critical habitat**

| MCR steelhead critical habitat | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Streams crossed | 2 streams Grub Creek, Tinker Creek | 3 streams EF Beech Creek, Tinker Creek, Clear Creek | 2 streams Tinker Creek, EF Beech Creek | 0 |

**Table 80. Alternative 3 road surface and number of stream crossings by riparian habitat conservation area (RHCA) category**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 | 5 | 2 | 0 |
| Category 2 | 3 | 8 | **10** | 0 |
| Category 4 | 6 | 12 | **49** | **6** |
| **Total** | **12** | **25** | **61** | **6** |

**Table 81. Alternative 3 road surface, road designation, stream crossings, and number of route crossings (bolded text indicates increase from alternative 2)**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 crossings (open Forest Service and County roads) Grub Creek, Tinker Creek, Lake Creek | 5 crossings (open Forest Service and County roads) Lake Creek, Tinker Creek, Clear Creek, EF Beech Creek, Thompson Creek | 2 crossings (1 open Forest Service road and 1 closed to open Forest Service road) | 0 |
| Category 2 | 3 crossings (open Forest Service and County roads) | 8 crossings (6 open Forest Service and 2 open County roads) | **10 crossings (4 open Forest Service and 6 closed to open Forest Service roads)** | 0 |
| Category 4 | 6 crossings (open Forest Service and County roads) | 12 crossings (9 open Forest Service and 3 open County roads) | **49 crossings (11 open Forest Service and 35 closed to open Forest Service roads)** | **6 crossings** |
| **Total** | **12** | **25** | **61** | **6** |

**Road Decommissioning and Road Closures** – Approximately 0.32 miles of road decommissioning would occur on 1 segments of road within alternative 3. The decommissioned segment occurs within a Category 4 RHCA on Grub Creek approximately 1 miles above MCR steelhead critical habitat. Close Road segments occur on East Fork Beech Creek and unnamed tributaries to East Fork Beech Creek, and Clear Creek above MCR steelhead critical habitat. The miles of road closure within alternative 3 are less than alternative 2 within Category 2 and 4 RHCAs (approximately 0.08 miles).

**Table 82. Alternative 3 miles of decommissioned road and closed road segments with riparian habitat conservation area (RHCA) categories (same as alternative 2)**

| Road changes within 100 feet of RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Decommissioning | 0 | 0 | 0.32 |
| Close road | 0.03 | 0 | 0.12 |

Decommissioning activities result in the removal of a road from the permanent transportation system of the Forest. The impacts of the road on the environment are eliminated or reduced to an acceptable level; the goal is to leave the road in a “hydrologically disconnected” state and convert the former roadway to other resource use. Decommissioning includes restoring hydrologic function by re-contouring, subsoiling, and scarification of the surface. Watershed design criteria identify specific measures for decommissioning.

The National Forest Management Act (NFMA) requires “re-establishing vegetative cover” on decommissioned roads within 10 years {16 USC 1608(b)}. To accomplish this, the roadbed would be covered with natural materials such as logs, rocks, slash, and brush for a distance deemed to prohibit motor vehicle use; re-contouring, ripping/subsoiling, and seeding would occur as necessary; roads decommissioned within RHCAs would also be planted with conifers to maintain vegetation establishment and growth. Vegetation would be re-established as well via seeding and planting of conifers and hardwoods.

Road decommissioning activities would not include removal of trees that could function as LWD in stream channels, nor result in delivery of sediment to streams to a degree that pools are filled; therefore, reductions in existing pool habitat would not occur. Conifers would be planted in decommissioned road segments in RHCAs as part of the decommissioning process. Further, LWD would be added to streams adjacent to decommissioned roads (see LWD discussion below). Restoration of floodplain connectivity and stream channel complexity through road decommissioning, LWD additions, and revegetation activities would restore stream process and function, and result in a long-term increase in pool frequency over the long term that is positive and meaningfully measureable. Restoration of LWD recruitment processes on the sides of streams where roads previously occurred would increase and maintain LWD recruitment and resulting pool frequency in the long-term (70 to 100 years).

Road decommissioning would have a positive and meaningfully measurable effect on pool frequency within Grub Creek.

Approximately 0.15 miles of open roads would be closed under alternative 3 within Category 1 and 4 RHCAs (Table 82). This is 1.85 miles less than alternative 2. Closed roads are those roads on which motorized traffic has been excluded by regulation, barricade blockage, or by obscuring the entrance. A closed road is still an operating facility on which motorized traffic has been removed (year-long or seasonal) and remains on the Forest Road Transportation System. Roads would be closed using gates or signs. Closed roads would be left in a stable condition and maintained.

Two segments of roads would be closed in the Category 4 RHCA of Clear Creek and East Fork Beech Creek and 1 road segment on RHCA Category 1 on Clear Creek. Closure of these road segments would likely reduce delivery of fine sediment to Clear Creek and East Fork Beech Creek from road use, although this reduction in sediment would not result in a meaningfully measureable change to pool frequency within TES/MIS species habitat.

The effects of road closures on pool frequency would be the same as those described in alternative 2 for pool frequency.

**Road Maintenance and Use (includes haul, water drafting)** – Approximately 17.8 miles of haul routes and road maintenance would occur in Category 1, 2, and 4 RHCAs; approximately 7.1 miles of these activities would occur within 100 feet of Category 1 RHCA streams (Table 83). The number of miles of native surface and temporary road within 100 feet of Category 2 and 4 RHCAs is greater in alternative 3 that alternative 2 (Table 83). Road maintenance would occur on all haul routes. With implementation of PDCs, delivery of fine sediment resulting from road maintenance and use would not be of sufficient magnitude to result in a meaningfully measureable reduction in pool frequency. However, the increase in native surface and temporary road haul routes within alternative 3 increases the risk associated with delivery of fine sediment into pools more than alternative 2.

**Table 83. Alternative 3 miles of road type and road surface within 100 feet of Category 1, 2 and 4 riparian habitat conservation areas (RHCAs). Bold numbers indicate difference from alternative 2 (more miles)**

| Roads within 100 feet of RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Miles | 7.08 | 3.23 | 7.45 |
| **Road type within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Closed to open Forest Service road | 0.35 | **1.15>** | **4.25>** |
| Open County road | 1.93 | 0.25 | 0.33 |
| Open Forest Service road | 4.77 | **1.82>** | 2.13 |
| Temporary road | 0.04 | 0.011 | 0.68 |
| **Total miles** | 7.09 | **3.23** | **7.45** |
| **Road surface within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Asphalt | 0.47 | 0.6 | 0.43 |
| Crushed aggregate or gravel | 5.96 | 1 | 0.26 |
| Native material | 0.59 | **1.5>** | **5.91>** |
| Temporary | 0.07 | 0.1 | 0.70 |
| Improved native material | | 0.1 | 0.14 |
| **Total miles** | 7.09 | **3.3** | **7.44** |

**Table 84. Alternative 3 miles of road type and surface type for haul within 100 feet of Mid-Columbia River steelhead critical habitat. Bold numbers indicate difference from alternative 2 (> indicates increase, < indicates decrease)**

| Road type | Asphalt | Crushed aggregate | Native material |
|---|---|---|---|
| Closed to open Forest Service road | 0 | 0 | 0.11 |
| Open County road | **0<** | **1.10>** | 0 |
| Open Forest Service road | **0.04<** | **0.53<** | **1.15>** |
| Temporary road | 0 | 0.01 | 0 |
| **Total miles** | **0.04** | **1.64** | **1.66** |

The miles of Forst Service native surface road within 100 feet of MCR steelhead and open county road on crushed aggregate increases within alternative 3 from alternative 2 (Table 84).

Water withdrawals for dust abatement during haul activities would occur. Water withdrawals would be in accordance with the PDCs, including National Marine Fisheries Service guidance. Use of these PDCs would insure that water withdrawals do not result in a reduction in pool habitat.

*Recreation Trail Construction and Interpretive Signage* – In alternative 3, 92.4 miles of trail are proposed with 80.8 miles of new trail construction. A total of 28.2 miles of these trails are within the Nipple Butte IRA (Table 85). The miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat as well as the number of crossings are summarized in Table 85. The number of RHCA crossings within RHCA categories increases from alternative 2 with a large increase in category 4 RHCA crossings when compared to alternative 2. The number of crossings within MCR steelhead critical habitat is the same as alternative 2. The mile of trail within 100 feet of all RHCA categories is greater for alternative 3 than alternative 2. The miles of MCR steelhead critical habitat is the same as alternative 2.

With implementation of PDCs, BMPs, Central Oregon Trail Alliance trail standards, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs, there would be a negative but not meaningfully measurable effect to pool frequency from this proposed activity. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

**Table 85. Alternative 3 trails—number of stream crossings in riparian habitat conservation areas (RHCAs) and Mid-Columbia River (MCR) steelhead critical habitat, and miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat**

| Proposed trail | Miles of trail |
|---|---|
| Total proposed trail | 92.4 |
| New construction | 80.8 |
| Within Nipple Butte Inventoried Roadless Area | 28.2 |
| **Stream designation** | **Number of stream crossings** |
| Category 1 RHCA | 9 |
| Category 2 RHCA | 17 |
| Category 4 RHCA | 52 |
| Mid-Columbia River steelhead critical habitat | 4 |
| **Stream designation** | **Miles of trail within 100 feet of RHCA and MCR steelhead critical habitat** |
| Category 1 RHCA | 1.49 |
| Category 2 RHCA | 2.08 |
| Category 4 RHCA | 3.07 |
| Mid-Columbia River steelhead critical habitat | 0.41 |

**Day Use Area North Side Magone Lake** – The effects to pool frequency are the same as described for alternative 2.

**Fish Cribs and Fish Sticks** – The effects to pool frequency are the same as described for alternative 2.

**Day Use Boat Dock, Campground Boat Mooring, Fishing Dock** – The effects to pool frequency are the same as described for alternative 2 for the day use boat dock and campground mooring with the exception of the addition of a seasonal floating fishing dock placed approximately 0.3 miles further down the existing trail from the new day use area in the vicinity of fish cribs and fish sticks. PDCs would be followed regarding access to the dock; this includes hardening of the shoreline access point and proper drainage features to the dock and those required under the Oregon State Marine Board for public safety. Dock would be constructed out of material that requires very limited maintenance and does not contribute contaminants to the water (leaching) but fits the “rustic” setting. Dock would consist of individual floating sections that can be removed in the fall and placed back in the spring. Presence of the fishing dock may alleviate the potential for trampling of shoreline vegetation adjacent to the proposed new day use area by recreationists and the shoreline on the east side of Magone Lake in general.

**Direct and Indirect Effects – Water Temperature and Stream Shading**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 3and are the same as described for described for alternative 2 with the exception of an increase in the upland acreages proposed under silviculture treatments, therefore no meaningfully measureable effects to water temperature and stream shading are expected.

The effects of skyline yarding on water temperature and shade would be the same as those described for alternative 2, but with greater intensity due to the increase in acreage identified for skyline.

The effects to stream shading and water temperature from upland aspen restoration are the same as described for alternative 2.

Felling of danger trees may occur along roughly 7.09 miles of haul routes that are within 100 feet of Category 1 RHCA streams, and previous field observations suggest 1 to 2 trees per mile may be felled for a total of 8 to 14 trees over 7 miles. Danger trees are usually dead and provide little shade especially when surrounded by live trees; considering this as well as the minimal number of danger trees anticipated to be felled, measurable increases in stream temperatures would not likely result from proposed danger tree felling. Additionally, danger trees felled within or into RHCAs would be felled into the stream where feasible or otherwise left within the RHCA. Conifers felled into streams would immediately shade a minor portion of the stream, as well as provide sheltered sites for riparian hardwood growth through reduction of browse by herbivores, which would enhance stream shading in the long-term.

*Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)*

Fuels treatments within silvicultural treatment unit acreages increase by 2,182 acres and from 108 units to 164 units with alternative 3. Prescribed burning within the Nipple Butte IRA would be confined to the fall but the acreages remain the same as described for alternative 2.

The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to aquatic resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other hardwoods, and increasing the canopy base height. The effects of prescribed burn on stream shade and water temperature are the same as those described for alternative 2, but to a greater extent due to the increase in acreage.

Piling and burning would occur outside of the primary shade zone within RHCAs and would not impact water temperature or stream shading.

Biomass removal is not proposed for within RHCAs, therefore no impact to stream shading or water temperature is anticipated.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 3. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future pool habitat. Most temporary roads would have a discountable effect to fisheries resources (see discussion under pool frequency alternative 2). Sites requiring the removal of shade-providing trees for temporary road construction are limited in size and frequency and outside of 100 feet from the stream channel. The majority of shade-providing trees removed adjacent to streams would occur along intermittent streams, reducing the likelihood that removal of these trees would result in a change in water temperature because intermittent streams go dry before water temperatures in occupied TES/MIS habitat downstream become limiting to fish.

The removal of shade associated with construction of temporary roads would have a negative effect to stream shading and water temperature that would not be meaningfully measureable.

**Stream Crossings and Improvement** – The effects related to stream crossings on shade and water temperature are the same as those described for alternative 2. In alternative 3 the number of crossings on native surface roads is greater than that of alternative 2. Therefore, the intensity of those effects is greater in alternative 3 than alternative 2. Stream crossing activities may involve removal of trees and other shading vegetation, however these activities would not likely result in a measureable increase in water temperature due to the small disturbance footprint and well-developed canopy of shade-producing trees in the vicinity of the crossings where tree removal would occur. Effects would be negative but not meaningfully measurable.

The effects of stream crossing improvements on shade and water temperature are the same as those described in alternative 2 but with the increase in roads within 100 feet of RHCAs and the number of crossings the intensity of these improvements is expected to increase and be greater than alternative 2.

**Road Decommissioning and Road Closures** – The effects of road decommissioning and road closures on shade and water temperature under alternative 3 are the same as described for alternative 2. Alternative 3 has less miles of road closure within category 2 and 4 RHCAs than alternative 2. Because there are less miles of road closure the benefits associated with these actions on shade and water temperature are also less.

**Road Maintenance and Use (includes haul, water drafting)** – Approximately 17.8 miles of haul routes and road maintenance would occur in Category 1, 2, and 4 RHCAs; approximately 7.1 miles of these activities would occur within 100 feet of Category 1 RHCA streams (Table 83). The number of miles of native surface and temporary road within 100 feet of Category 2 and 4 RHCAs is greater in alternative 3 than alternative 2 (Table 83). Road maintenance would occur on all haul routes. With implementation of PDCs, delivery of fine sediment resulting from road maintenance and use would not be of sufficient magnitude to result in a meaningfully measureable reduction in shade and water temperature. However, the increase in native surface and temporary road haul routes within alternative 3 increases the risk associated with removal of shade trees for maintenance and haul at RHCA crossings and within 100 feet of roads more so than alternative 2.

Water withdrawals for dust abatement during haul activities would occur. Water drafting can occur only as long as supply is adequate to provide for both fish and withdrawal. The maximum withdrawal from one site in an 8-hour period would be 18,000 gallons of water. Water withdrawals would be in accordance with the criteria described in the 2010 Malheur National Forest Road Maintenance Biological Assessment and National Marine Fisheries Service guidance, included in Appendix C – Project Design Criteria. Use of these criteria would insure that water withdrawals do not result in a measurable increase in water temperatures.

**Recreation Trail Construction and Interpretive Signage** – The general effects related to trail construction for shade and water temperature are the same as alternative 2 for shade and water temperature. The miles of trail construction within 100 feet of RHCAs increases substantially from alternative 3. However, clearing of shade providing trees would not occur as part of trail construction and design standards for trails within riparian areas (COTA 2011). Due to the distance from the streams trail construction is not expected to have a negligible and not meaningfully measurable effect on stream shade and water temperature.

The effects to shade and water temperature for interpretive signage are the same as those described for alternative 2.

**Day Use Area North Side Magone Lake** – The effects of making approximately 0.5 miles of trail around Magone Lake accessible and constructing a day use area on the north side of Magone Lake is not expected to have a meaningfully measurable effect on shade or water temperature. The north side of Magone Lake is relatively open with large ponderosa pine generally spaced 50 feet or greater apart. Removal or felling of shade trees for construction of the day use area is not expected to occur.

**Fish Cribs and Fish Sticks** – The number of fish cribs and fish sticks placed within Magone Lake is the same as described for alternative 2. Effects to shade and water temperature is not expected to be meaningfully measurable due to the material for the cribs and fish sticks coming from greater than 50 feet from the lake shoreline therefore not effecting primary shade trees. However, additional shade over water from floating fish sticks immediately adjacent to the shoreline is expected to be positive in the form of overhead cover for fish and nesting areas for waterfowl is expected to be meaningfully measurable within Magone Lake.

**Day Use Boat Dock, Campground Boat Mooring, Fishing Dock** – The effects to shade and water temperature from installation of a day use boat dock and campground boat mooring are the same as described for alternative 2. No tree removal from within 50 feet of the shoreline is expected as part of the fishing dock installation and placement therefore no effect to shade or water temperature is expected from placement of the fishing dock. However, a positive but not meaningfully measurable effect for overhead cover created by the fishing dock is anticipated.

**Direct and Indirect Effects – Large Woody Debris**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 3, therefore no meaningfully measureable effects to LWD are expected.

The effects of skyline yarding on LWD would be the same as those described for alternative 2, but with greater intensity due to the increase in acreage identified for skyline.

Aspen restoration treatments are the same as described for alternative 2 and would not likely result in negative and meaningfully measurable effects to LWD due to the small scale of treatments, and these aspen stands being located outside of RHCAs. The reduction in stocking densities following treatments would increase new growth of aspen and the vigor of larger aspen in the overstory.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The majority of fuels treatment activities would occur outside of RHCAs. Where prescribed burning does occur within RHCAs, the majority would be low intensity fires, using techniques that would achieve mortality of understory trees in burned patches but few overstory trees would be killed. Methods would be implemented as described in the fuels section to protect large trees. Fire intensities would not be high enough to consume trees or downed wood large enough to function as LWD in stream channels. The reduction in stocking densities following burning activities would increase the vigor of larger trees in the overstory. Consumption of coarse wood near stream channels greater than 4 inches DBH would be minimized. Beche et al. (2005) found that prescribed fire did not change the amount or movement of LWD in their study reach relative to unburned streams.

Moderate-intensity burning would occur in openings associated with riparian enhancement willow, cottonwood, aspen, and hawthorn activities. However, these burns would occur after riparian enhancement. Minor short-term reduction in LWD from moderate severity burning is anticipated, and some consumption of smaller size classes of downed LWD is expected; the magnitude of this reduction is anticipated to result in negative effects to LWD that are not meaningfully measureable. Long-term beneficial effects to LWD are anticipated to occur from the restoration of fire-related riparian processes and functions through burning to invigorate riparian areas the effects of which are anticipated to be positive and meaningfully measureable for existing and recruitment LWD.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 3. The miles of temporary roads with alternative 3 increases from alternative 2. Two temporary roads within MCR steelhead critical habitat occur within Tinker Creek (existing roadbed) and East Fork Beech Creek. Therefore, the effects to large wood are greater than alternative 2 for temporary road construction. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future LWD. Most temporary roads would have a discountable effect to fisheries resources (see discussion under pool frequency for alternative 2). Sites requiring the removal of trees that could be recruited as LWD for temporary road construction are limited in size and frequency, and the majority of trees removed adjacent to streams occur along intermittent streams, upstream of occupied habitat for TES/MIS species. Conifers would be felled into streams where feasible as described above. In most cases, trees that can safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Further, only a percentage of conifers removed would be close enough to the channel to provide LWD. Temporary road construction would have a negative effect on LWD that would not be meaningfully measurable.

**Stream Crossings and Improvements** – The effects of stream crossings on LWD are the same as alternative 2. However, the number of crossings within Category 2 and 4 RHCAs on native surface roads increases by 8 within Category 2 and by 8 within category 4 RHCAs (Table 80). Stream crossing activities may involve removal of trees that could function as recruitment LWD; however, any trees requiring removal would be tipped and placed into streams to provide immediate LWD. These activities would have a positive effect on LWD by ensuring that any removed trees immediately provide the stream processes and functions of LWD, although due to the small scale of treatments, a slight meaningfully measureable effect is anticipated.

The effects of stream crossing improvements to LWD are the same as those described in alternative 2, with the intensity of these treatments increasing due to an increase in the miles of road within 100 feet of RHCAs and the number of stream crossings.

**Road Decommissioning and Road Closure** – Road decommissioning activities would not include removal of trees that could function as LWD in stream channels. Conifers would be planted in decommissioned road segments as part of the decommissioning process. Over the long-term (70 to 100 years) LWD recruitment processes would be restored on the sides of streams previously occupied by roads as planted conifers become established and trees that fall across the previous roaded area are no longer cut and removed for vehicle access. Further, LWD additions would occur in streams associated with road decommissioning. The miles of road decommissioning are the same as described for alternative 2. Road decommissioning would have a positive effect on LWD that would be meaningfully measureable.

The effects of road closures on LWD are the same as those described for alternative 2.

**Road Maintenance and Use (includes haul, water drafting)** – The effects of road maintenance activities on LWD within alternative 3 is same as for alternative 2 but at an increased intensity because the miles of road within 100 feet of RHCAs and the number of crossings increases.

The miles of closed to open road and open Forest Service road within 100 feet of category 2 and 4 RHCAs for alternative 3 is greater than for alternative 2. The majority of these roads are on native material roads (Table 83). Activities would not likely result in a reduction of LWD to Category 1, 2, or 4 RHCA stream channels because in most cases, trees that can only safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Where conifers are felled into the stream, they would immediately function as LWD. The effects of this action would be negative for LWD but would not be meaningfully measurable.

**Recreation Trail Construction Interpretive Signage** – The general effects of trail construction on LWD would be the same as described for alternative 2. However, the intensity of these effects increases by the number of miles within 100 feet of category 1, 2, 3 and 4 RHCAs (Table 85). Within alternative 3, the miles of trail within 100 feet of streams increases within each RHCA category when compared to alternative 2. The number of trails crossing streams within category 2 RHCAs doubles and the crossings within Category 4 RHCAs increases almost threefold from alternative 2. The effects of trail construction and stream crossings are expected to be of a greater intensity than that of alternative 2. However, felling of large-diameter primary shade trees within the RHCA is not anticipated for trail construction especially within 100 feet of Category 1 and 2 RHCAs. Therefore a neutral effect for LWD is expected from the felling or removal of smaller diameter trees as part of trail construction.

The effects to LWD from interpretive signage around Magone Lake is the same as described for alternative 2.

**Day Use Area North Side Magone Lake** – The effects to LWD for construction of a day use area on the north side of Magone Lake is the same as described for alternative 2 for LWD. Felling of any large trees within 100 feet of the shoreline is not expected to occur, therefore no effect to LWD within Magone Lake is expected.

**Fish Cribs and Fish Sticks** – The number of fish cribs and fish sticks added to Magone Lake for alternative 3 is the same as described for alternative 2. The addition of entire trees out from the shoreline and fish cribs within the lake is expected to have a beneficial and meaningfully measureable effect on LWD within Magone Lake.

**Day Use Boat Dock, Campground Boat Mooring, Fishing Dock** – The effects to LWD associated with the day use boat dock and campground boat mooring are the same as described for alternative 2. Since no trees are expected to be felled for installation of the fishing dock, no effect to LWD within Magone Lake is expected.

**Direct and Indirect Effects – Embeddedness and Fine Sediment**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 3; therefore no meaningfully measureable effects to embeddedness and fine sediment are expected. No commercial treatments would occur within RHCAs.

The effects of skyline yarding on embeddedness and fine sediment would be the same as those described in alternative 2, but with greater intensity due to the increase in acreage identified for skyline. In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

Since proposed aspen restoration treatments and danger tree felling do not involve ground-disturbing activities, inputs of fine sediment are not expected to occur.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – Most fuels treatment activities would occur outside of RHCAs. Ignition of prescribed burns would occur outside RHCAs, allowing fire to back into RHCAs from upslope burning units. Ignition would also occur within some RHCAs, stopping within 25 feet of the stream channel.

Due to the minor extent of moderate severity burning activities and PDCs that would be implemented with this action, moderate severity prescribed burning would not result in delivery of fine sediment to stream channels sufficient to result in meaningfully measureable effects to embeddedness and fine sediment. As invigorated riparian vegetation growth following the reintroduction of fire occurs, fine sediment from upland sources would be filtered and stored in the outer portions of RHCAs, resulting in a long-term beneficial effect to embeddedness and fine sediment that is meaningfully measureable.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 3. Limiting these ground-disturbing activities to areas outside of RHCAs along with erosion control BMPs would prevent negative and meaningfully measurable impacts to embeddedness and fine sediment. PACFISH RHCA buffer widths were designed to provide an area to trap fine sediment generated from upslope activities such as timber harvest.

The miles of temporary road construction (including post-use rehabilitation) of the segments that come to within 100 feet of a Category 1 stream channel in East Fork Beech Creek and Tinker Creek would likely result in creation and transport of fine sediment to East Fork Beech Creek and Tinker Creek due to loosening of sediment particles, destruction of ground cover, and construction of a new roadbed within the RHCA.

Proposed temporary road construction activities in RHCAs would likely result in creation and transport of fine sediment to stream channels due to loosening of sediment particles and destruction of ground cover. With implementation of PDCs, construction of most temporary roads within category 4 RHCAs would not result in a meaningfully measureable increase in embeddedness and fine sediment. However, temporary road 6 within East Fork Beech Creek goes up a steep hillside slope where no existing roadbed is present within MCR steelhead critical habitat. Temporary road 29 is on an existing roadbed that travels up a category 4 RHCA within MCR steelhead critical habitat and consists of a steep grade connected to Tinker Creek. Due to the steepness of the temporary road grades, lack of an existing roadbed, and risk associated with road drainage features the level of sediment generated from construction of these temporary roads within MCR steelhead critical habitat is expected to be negative and meaningfully measurable for fine sediment and embeddedness.

**Stream Crossings and Improvements** – The effects of stream crossings for alternative 3 are the same as those described for alternative 2 but at a greater intensity. However, due to the increase in the number of stream crossings within Category 2 and 4 RHCAs on native surface roads when compared to alternative 2 (Table 71 and Table 79), the effect is expected to be negative but not meaningfully measurable for embeddedness and fine sediment with implementation of log haul PDCs (Appendix C – Project Design Criteria).

The effects of stream crossing improvement on fine sediment and embeddedness would be the same as those described in alternative 2, but at a greater intensity because of the increase of haul routes within 100 feet of RHCAs and the number of RHCA crossings but is not expected to rise to a level that is meaningfully measurable for fine sediment and embeddedness.

**Road Decommissioning and Road Closure** – The miles of road decommissioning identified within RHCAs in alternative 3 are the same as described for alternative 2. The procedure for decommissioning a road would include removing all culverts and reshaping the immediate area. In addition, cross ditches would be constructed to maintain drainage and reduce the potential for surface erosion. These measures would be implemented during decommissioning to "hydrologically disconnect" roads from streams, to reduce sediment entering streams and affecting fish habitat.

There is a short-term risk of generating sediment during and shortly after decommissioning activities, which could reach streams, primarily near stream crossings where culvert removal, scarification, or subsoiling is needed to discourage vehicle use and improve infiltration. Bare soil is prone to erosion and can result in fine sediment entering stream channels and resultant increases in turbidity. Habitat impacts are likely to include areas of exposed streambank in isolated locations primarily in the vicinity of stream crossings. Exposed areas and other disturbances that occur are likely to result in a slight increase in turbidity for a short distance downstream during rainstorms or runoff events. However, given background levels of turbidity during runoff events it would be difficult to distinguish between turbidity resulting from this project activity and background turbidity. An unknown amount of sediment would be mobilized into streams. Timing of work outside of the wet season and adherence to all PDCs and BMPs would further limit fine sediment delivery. A slight increase in fine sediment deposition for a short distance downstream of exposed and disturbed areas is also likely to occur. There is the potential for fine sediment to slightly increase embeddedness within gravels suitable for spawning when the gravel is located immediately downstream from road decommissioning sites. Increased embeddedness may also result in a decrease in the potential for production of aquatic macroinvertebrates as discussed above. These impacts are expected to be localized and short-term. Consequently, the effect to embeddedness and fine sediment by road decommissioning is negative and expected to be measureable.

Road decommissioning would also have a positive and meaningfully measureable effect on embeddedness and fine sediment due to a lasting but minor decrease in fine sediment delivery to streams as a result of hydrologically disconnecting unneeded roads from the drainage system. Design criteria include those identified in the ARBO as well as design criteria developed by the Blue Mountain Ranger District interdisciplinary team. The ARBO PDCs specific to this project would be implemented as described in the ARBO. Implementation of the PDCs, as well as implementation of any Reasonable Prudent Measures and Terms & Conditions from Endangered Species Act section 7 consultation with National Marine Fisheries Service and the U.S. Fish and Wildlife Service (Appendix C – Project Design Criteria) would reduce the probability and magnitude of this short-term risk.

After about 2 years, effects of road decommissioning are beneficial for water quality and fish habitat. The improved infiltration and ground cover condition of the decommissioned roads, as well as restoration of the energy-dissipating functions associated with floodplain connectivity, would help restore natural watershed function, including reduced sediment yield from the road prism.

The effects of road closure on embeddedness and fine sediment are the same as those described for alternative 2.

**Road Maintenance and Use (includes haul and water drafting)** – The miles of road within 100 feet of RHCAs for haul is greater than alternative 2 for alternative 3 in Category 2 and 4 RHCAs (Table 83). The effects of road maintenance on embeddedness and fine sediment are the same as those described for alternative 2. However, the effects are expected to increase in intensity due to the increase in miles of road within 100 feet of Category 2 and 4 RHCAs. Road maintenance would occur at a level commensurate with use, and would include several activities that may potentially result in sedimentation from the road prism to the ditch line or the adjacent slope. Typical road maintenance activities would blade and shape the road, including existing drainage dips, grade sags, and waterbars; repair damaged culverts and ditches; place rock in some existing drainage dips and grade sags; place rock in wet areas of road; remove brush and danger trees; and apply dust abatement. Machinery would be kept on the road prism.

The longer term effects of road maintenance are to maintain or improve existing road conditions. Road maintenance may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs. Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance may occur on all or nearly all of the haul roads.

Proposed road maintenance and haul activities in RHCAs would likely result in creation and transport of a negligible amount of fine sediment to stream channels due to loosening of sediment particles and destruction of ground cover. However, PDCs would be implemented during these activities, and are expected to limit fine sediment delivery to streams, keeping amounts reaching stream channels to negligible levels for other than rare precipitation events (negative but not meaningfully measurable).

Water withdrawals for dust abatement during haul would be in accordance with the PDCs, including National Marine Fisheries Service guidance. Use of PDCs for water drafting would ensure that water withdrawals do not result in significant delivery of fine sediment to streams.

**Recreation Trail Construction Interpretive Signage** – In alternative 3, 92.4 miles of trail are proposed with 80.8 miles of new trail construction. A total of 28.2 miles of these trails are within the Nipple Butte IRA (Table 85). The miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat as well as the number of crossings are summarized in Table 85. The number of RHCA crossings within RHCA categories increases from alternative 2 with a large increase in category 4 RHCA crossings when compared to alternative 2. The number of crossings within MCR steelhead critical habitat is the same as described for alternative 2. The mile of trail within 100 feet of all RHCA categories is greater for alternative 3 than alternative 2. The miles of MCR steelhead critical habitat is the same as described for alternative 2.

Implementation of PDCs, BMPs, and ARBO criteria for livestock crossing streams on recreational trail crossings within Category 1 and 2 RHCAs are expected to limit fine sediment delivery to streams; however, effects are expected to be negative and meaningfully measurable for embeddedness and fine sediment due to the magnitude of trails and trail crossings within category 4 RHCAs in alternative 3. No interpretive sites or trailheads are within Category 1, 2, or 4 RHCAs or within MCR steelhead critical habitat.

The effects of interpretive signage on fine sediment are the same as described for alternative 2.

**Day Use Area North Side Magone Lake** – The effects for embeddedness and fine sediment for construction of a day use area on the north side of Magone Lake is the same as described for alternative 2. Construction of a day use area may increase the activity along the shoreline immediately adjacent to the day use area. This activity could result in trails devoid of vegetation traversing down the slope from the day use area. With implementation of PDCs and BMPs the effects for fine sediment are expected to be negative but not meaningfully measurable.

**Fish Cribs and Fish Sticks** – Disturbance related to tipping of conifers for fish cribs and fish sticks will occur more than 50 feet from the Magone Lake Category 3 RHCA shoreline. Rootwads attached to trees may contain a small amount of soil when placed within the lake. PDCs requiring work to occur over snow and frozen ground and BMPs would minimize any potential for sediment reaching the lake. Therefore, a negligible amount of fine sediment is expected to be delivered to Magone Lake and is not expected to be meaningfully measurable.

**Day Use Boat Dock, Campground Boat Mooring, Fishing Dock** – Sediment may be generated as part of installation and construction of access points for the docks but these areas would be small, approximately 4 by 4 feet. PDCs such as hardened shoreline access points for moorings, implementation of BMPs, and the use of primarily hand tools would minimize ground disturbance within these area. The effects for installation of a day use boat dock, campground boat mooring, and fishing dock are expected be negligible and not meaningfully measurable for sediment within Magone Lake.

**Direct and Indirect Effects – Width-to-Depth Ratio and Streambank Stability**

Width-to-depth ratio and streambank stability indicators are grouped since they are affected similarly by project elements.

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The acres of silviculture prescriptions, yarding, and danger tree felling is greater than alternatives 2 and 4. Most timber felling activities would have a neutral effect on width-to-depth ratios and streambank stability due to proximity of most actions away from the stream channel and outside of RHCAs in addition to implementation of PDCs and BMPs.

The effects of skyline yarding on width-to-depth ratios and bank stability would be the same as those described for alternative 2, but with greater intensity due to the increase in acreage identified for skyline. In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

The possible minor amounts of sediment entering channels and small areas of bank instability would not affect width-to-depth ratios at the site or reach scale. Effects from these actions on width-to-depth ratios would be neutral.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The acreage of fuels treatments within alternative 3 is greater than alternative 2. Planned ignitions within the Nipple Butte IRA would only occur in the fall.

Minor short-term decrease in stream bank stability would occur as a result of prescribed burning activities outside RHCAs where fire is allowed to back into the RHCA until vegetation recovers. However, it is unlikely that burned patches along stream banks would be in sufficient sizes or quantities to result in a meaningfully measureable decrease in bank stability. These impacts would not be of a scale that would result in destabilization of stream channels, thus a neutral effect to width-to-depth ratios from fuels treatments is anticipated. Over the long-term, as fire invigorates riparian shrub growth, bank stability would increase in a meaningfully measureable way. No effects to bank stability or width-to-depth ratios are expected from pile burning and biomass removal due to proximity of these activities away from stream channels.

**Temporary Roads and Landings** – No landings would occur within RHCAs. Construction of a temporary road that comes to within 100 feet of East Fork Beech Creek and Tinker Creek is proposed, but would not damage stream banks or deliver sediment to the degree that any effects to bank stability or width-to-depth ratios would occur (neutral effects).

**Stream Crossings and Improvements** – The effects of stream crossings on streambank stability and width-to-depth ratios are the same as those described for alternative 2, but with greater intensity. The number of native surface road crossings increases within category 2 and 4 RHCAs (Table 79). Stream crossings would address current bank stability and width-to-depth ratio issues at crossing sites, having long-term beneficial effects to stream processes and functions that extend well beyond those work sites. Effects from stream crossing improvements on width-to-depth ratios and bank stability would be positive and meaningfully measureable.

**Road Decommissioning and Road Closure** – Road decommissioning and road closure would positively affect bank stability and width-to-depth ratios by obliterating roads that restrict floodplain connectivity and closing roads that may be creating bank instability. The minor amount of sediment delivered to streams associated with road decommissioning would not affect width-to-depth ratios. Due to the extent and location of treatments, this effect would be positive and meaningfully measureable.

The effects of road closure on streambank stability and width-to-depth ratios is the same as those described for alternative 2.

**Road Maintenance and Use (includes haul, water drafting, road closures, and recreation interpretive site development)** – The possible minor amounts of sediment entering channels from road maintenance activities would not affect floodplain connectivity, streambank stability, or width-to-depth ratios at the site or reach scale. A neutral effect is anticipated.

**Recreation Trail Construction and Interpretive Signage** – The general effects related to trail construction for width-to-depth ratios and bank stability are the same as described for alternative 2 for alternative 3. However, the miles of trail construction within 100 feet of RHCAs increases substantially within alternative 3. However, clearing of shade-providing trees would not occur as part of trail construction and trail widths would be less than 3 feet. Due to the number of trail miles within 100 feet of streams and the number of stream crossings, trail construction is expected to have a negative and meaningfully measurable effect on streambank stability and a neutral effect on width-to-depth ratios.

The effect of interpretative signage around Magone Lake is the same as those described for alternative 2.

**Day Use Area North Side Magone Lake** – The effects to bank stability and width-to-depth ratios are the same as described for alternative 2 for construction of a day use area on the north side of Magone Lake.

**Fish Cribs and Fish Sticks** – The effects to bank stability and width-to-depth ratios for installation of fish cribs and fish sticks are the same as described for alternative 2

**Day Use Boat Dock, Campground Boat Mooring, Fishing dock** – The effects to bank stability and width-to-depth ratios for installation of a day use boat dock and campground boat mooring are the same as described for alternative 2. Sediment may be generated as part of installation and construction of access points for the docks but these areas would be small, approximately 4 by 4 feet. PDCs such as hardened shoreline access points for moorings, implementation of BMPs, and the use of primarily hand tools would minimize ground disturbance within these areas. The effects of installation of a day use boat dock, campground boat mooring, and fishing dock are expected to be negligible and not meaningfully measurable for sediment within Magone Lake. Placement of a fishing dock adjacent to the proposed north side day use area may alleviate trailing along the shoreline by recreationists and minimize damage to shoreline vegetation by providing a hardened access point.

#### *Cumulative Effects*

Potential effects from alternative 3 would be cumulative with effects from non-federal activities within the project planning area and activities within the aquatic analysis area on federal, state, and private lands. Aside from this project, other non-restoration activities that may contribute to cumulative effects include: timber harvest activities, wildfires, livestock grazing, road use, flood irrigation/water diversion, and vegetation alteration.

Although the aquatic restoration actions covered under the Aquatic Restoration Decision would alleviate degraded conditions within RHCAs, there would be short-term adverse effects to several of the primary habitat elements; primarily fine sediment related to culvert replacement/removal, large and coarse wood placement, log weir and boulder modification, and prescribed fire. These actions directly address altered sediment transport regimes for scour and deposition and riparian vegetative structure resulting in long-term benefits for all fish habitat elements. (See discussion of aquatic restoration effects to past, present, and foreseeable activities relevant to cumulative effects analysis above and Table 94 below.)

### 3.8.2.6 Alternative 4

#### *Direct and Indirect Effects*

**Direct and Indirect Effects – Pool Frequency**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The number of acres within silviculture prescriptions and potential danger tree felling is less for alternative 4 than alternatives 2 and 3 (approximately ½ of alternative 2). The number of upland aspen stand treatments is the same for all alternatives except alternative 1. The majority of timber felling activities would occur outside of RHCAs under alternative 4, therefore no meaningfully measureable effects to pool frequency are expected.

The effects of skyline yarding on pool frequency would be the same as those described in alternative 2 but with less intensity due to the decrease in acreage identified for skyline. In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

The effects of aspen restoration activities on are the same as described for alternatives 2 and 3 for pool frequency.

The miles of haul route within RHCA categories for alternative 4 is less than alternatives 2 and 3. Effects related to felling of danger trees are the same as alternatives 2 and 3. Therefore, the effects related to danger tree felling on pool frequency would be less than those described in alternatives 2 and 3.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The acres of prescribed fire proposed for alternative 4 is less than alternatives 2 and 3. Planned ignitions would not occur in the Nipple Butte IRA. The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to fisheries resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other hardwoods, and increasing the canopy base height but to a lesser extent than described for alternatives 2 and 3.

Burning activities would not result in delivery of fine sediment to stream channels sufficient to result in a meaningfully measureable reduction of pool habitat. The reduction in stocking densities following burning activities would also increase the vigor of larger trees in the overstory for future LWD to create pools; this effect would be positive and meaningfully measureable.

Piling would not occur within RHCAs. Pile burning activities would not result in delivery of fine sediment to stream channels sufficient to result in a meaningfully measureable reduction of pool habitat.

Biomass removal activities would not occur in RHCAs. Biomass removal activities would not result in delivery of fine sediment to stream channels sufficient to result in a meaningfully measureable reduction of pool habitat.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 4. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future pool habitat. The effect of temporary road construction within Category 1 RHCAs on pool frequency is the same as described for alternative 2.

Temporary roads in Category 4 RHCA stream channels would not result in a reduction in pool frequency because of the existing road bed from past partial decommissioning and the fact that in most cases, trees that can only safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function in the formation of pools and/or contribute coarse particulate organic matter directly to the stream. No temporary roads would occur within MCR steelhead critical habitat in alternative 4.

**Table 86. Alternative 4 miles temporary and closed to open roads within Mid-Columbia River (MCR) steelhead critical habitat**

| Road type | Miles within MCR steelhead critical habitat (100 feet) native surface road |
|---|---|
| Closed to open Forest Service road | 0.11 (EF Beech Creek, Tinker Creek) |
| Temporary road | 0 |

With implementation of PDCs and BMPs, reopening of the closed road would result in a negative but not meaningfully measureable reduction in pool frequency for those on existing roadbeds.

*Stream Crossings and Improvements* – There are 9 crossings on MCR steelhead critical habitat, 2 are on asphalt, 5 are on crushed aggregate, and 2 are on native surface, which is the same as described for alternatives 2 and 3. Within Category 1, 2, and 4 RHCAs in the project planning area there are 12 crossings on asphalt, 25 on crushed aggregate, and 43 on native surface (Table 87). Road status for the crossings within each RHCA category for alternative 4 are summarized in Table 89. The effects of native road surface crossings described within alternatives 2 and 3 have decreased by an additional 18 native surface road crossings for haul within category 2 and 4 RHCAs (closed to open roads) and 1 less temporary road crossing. Stream crossings on native surface roads may contribute sediment to stream channels but with implementation of BMPs and PDCs related to rocking of road crossings and appropriate drainage features a reduction in pool frequency due to sediment inputs is not likely to occur. However, the risk associated with these crossings contributing sediment is decreased and thus the risk of a reduction in pool frequency decreases with the decrease in native surface road crossings.

The effects of stream crossing improvements on pool frequency are the same as those described in alternatives 2 and 3 but with less intensity due to a decrease in the miles of road within 100 feet of RHCAs and number of stream crossings.

**Table 87. Alternative 4 stream crossings by road surface type and Mid-Columbia River (MCR) steelhead critical habitat**

| MCR steelhead critical habitat | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Streams crossed | 2 streams Grub Creek, Tinker Creek | 5 streams EF Beech Creek, Tinker Creek, Clear Creek | 2 streams Tinker Creek, EF Beech Creek | 0 |

**Table 88. Alternative 4 road surface and number of stream crossings, by riparian habitat conservation area (RHCA) category**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 | 5 | 2 | 0 |
| Category 2 | 3 | 8 | 3 | 0 |
| Category 4 | 6 | 12 | **38** | 4 |
| **Total** | 12 | 25 | **43** | **4** |

**Table 89. Alternative 4 road surface, road designation, stream crossings**

| RHCA category | Asphalt | Crushed aggregate/gravel | Native surface | Temporary |
|---|---|---|---|---|
| Category 1 | 3 crossings (open Forest Service and County roads) | 5 crossings (open Forest Service and County roads) | 2 crossings (1 open Forest Service and 1 closed to open Forest Service roads) | 0 |
| Category 2 | 3 crossings (2 open Forest Service and 1 open County roads) | 8 crossings (6 open Forest Service and 2 open County roads) | 3 crossings (2 open Forest Service and 1 closed to open Forest Service roads) | 0 |
| Category 4 | 6 crossings (2 open Forest Service and 4 open County roads) | 12 crossings (9 open Forest Service and 3 open County roads) | 38 crossings (11 open Forest Service and 27 closed to open Forest Service roads) | 5 crossings |
| **Total** | **12** | **25** | **43** | **5** |

**Road Decommissioning and Road closure** – Approximately 0.32 miles of road decommissioning would occur on 1 segment of road with alternative 4, which is the same as alternative 2 and 3. The decommissioned segment within a category 4 RHCAs occurs on Grub Creek approximately 1 mile above MCR steelhead critical habitat (Table 90). Road closure segments occur on East Fork Beech Creek and unnamed tributaries to East Fork Beech Creek, and Clear Creek above MCR steelhead critical habitat (Table 90). The miles of road closure within alternative 4 are less than alternative 3 within Category 2 and 4 RHCAs (approximately 0.08 miles). The miles and locations of road decommissioning are the same as alternative 3 but less than alternative 2. The effects of road decommissioning for alternative 4 are the same as alternative 3, with slightly less of a positive and meaningfully measurable increase as that of alternative 2 in pool frequency for the long-term.

**Table 90. Alternative 4 miles of decommissioned road and closed road segments with riparian habitat conservation area (RHCA) categories**

| Road changes within 100 feet RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Decommissioning | 0 | 0 | 0.32 |
| Close road | 0.02 | 0 | 0.12 |

Decommissioning activities result in the removal of a road from the permanent transportation system of the Forest. The impacts of the road on the environment are eliminated or reduced to an acceptable level; the goal is to leave the road in a “hydrologically disconnected” state and convert the former roadway to other resource uses. Decommissioning includes restoring hydrologic function by re-contouring, subsoiling, and scarification of the surface. Watershed design criteria identify specific measures for decommissioning.

The National Forest Management Act (NFMA) requires “re-establishing vegetative cover” on decommissioned roads within 10 years {16 USC 1608(b)}. To accomplish this, the roadbed would be covered with natural materials such as logs, rocks, slash, and brush for a distance deemed to prohibit motor vehicle use; re-contouring, ripping/subsoiling, and seeding would occur as necessary; roads decommissioned within RHCAs would also be planted with conifers to maintain vegetation establishment and growth. Vegetation would be re-established as well via seeding and planting of conifers and hardwoods.

Road decommissioning activities would not include removal of trees that could function as LWD in stream channels, nor result in delivery of sediment to streams to a degree that pools are filled; therefore, reductions in existing pool habitat would not occur. Conifers would be planted in decommissioned road segments in RHCAs as part of the decommissioning process. Further, LWD would be added to streams adjacent to decommissioned roads (see LWD discussion below). Restoration of floodplain connectivity and stream channel complexity through road decommissioning, LWD additions, and revegetation activities would restore stream process and function, and result in a long-term increase in pool frequency that is positive and meaningfully measureable. Restoration of LWD recruitment processes on the sides of streams where roads previously occurred would increase and maintain LWD recruitment and resulting pool frequency in the long-term (70 to 100 years).

The effects of road closure on pool frequency are the same as those described for alternatives 2 and 3.

**Road Maintenance and Use (includes haul and water drafting)** – Approximately 14.8 miles of haul routes and road maintenance would occur in Category 1, 2, and 4 RHCAs; approximately 7 miles of these activities would occur within 100 feet of Category 1 RHCA streams. Road maintenance would occur on all haul routes. With implementation of PDCs, delivery of fine sediment resulting from road maintenance and use would not be of sufficient magnitude to result in a meaningfully measureable reduction in pool frequency.

**Table 91. Alternative 4 miles of road type and road surface within 100 feet of Category 1, 2 and 4 riparian habitat conservation areas (RHCAs). Bold numbers indicate difference from alternative 2 (fewer miles)**

| Roads within 100 feet of RHCA | Category 1 RHCA | Category 2 RHCA | Category 4 RHCA |
|---|---|---|---|
| Miles | 7.1 | 1.9 | 5.8 |
| **Road type within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Closed to open Forest Service road | 0.34 | 0.03 | 2.57 |
| Open County road | 1.9 | 0.25 | 0.4 |
| Open Forest Service road | 4.79 | 1.65 | 2.1 |
| Temporary road | 0.03 | 0 | 0.70 |
| Total miles | 7.1 | 1.9 | 5.8 |
| **Road surface within 100 feet of RHCA** | **Category 1 RHCA** | **Category 2 RHCA** | **Category 4 RHCA** |
| Asphalt | 0.5 | 0.7 | 0.5 |
| Crushed aggregate or gravel | 6 | 1 | 0.3 |
| Native material | 0.06 | 0.2 | 4.6 |
| Temporary | **0.03** | 0 | 0.4 |
| Improved native material | | 0.1 | 0.1 |
| Total miles | 7.1 | 1.9 | 5.8 |

**Table 92. Alternative 4 miles of road type and surface type for haul within 100 feet of Mid-Columbia River steelhead critical habitat**

| Road type | Asphalt | Crushed aggregate | Native material |
|---|---|---|---|
| Closed to open Forest Service road | 0.11 | 0 | 0.01 |
| Open County road | 0.28 | 0.82 | |
| Open Forest Service road | 0 | 0.60 | 1.13 |
| Temporary road | 0 | 0 | 0.01 |
| **Total miles** | **0.39** | **1.42** | **1.15** |

Water withdrawals for dust abatement during haul activities would occur. Water withdrawals would be in accordance with the PDCs, including National Marine Fisheries Service guidance. Use of these PDCs would insure that water withdrawals do not result in a reduction in pool habitat.

Approximately 0.14 miles of open roads would be closed under alternative 4. Closed roads are those roads on which motorized traffic has been excluded by regulation, barricade blockage, or by obscuring the entrance. A closed road is still an operating facility on which motorized traffic has been removed (year-long or seasonal) and remains on the Forest Road Transportation System. Roads would be closed using gates or signs. Closed roads would be left in a stable condition and maintained. The effects for pool frequency related to road closures would be the same as described for alternative 2.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within Category 1, 2 and 4 RHCAs is 1.06 miles, which is approximately 2 miles less than alternative 2, and 5 miles less than alternative 3. There are 7 RHCA crossings within alternative 4, which is 27 less than alternative 2 and 71 less than alternative 3. There are no crossings of MCR steelhead critical habitat within alternative 4, but 4 crossings within alternative 2 and 3.

There are no trails within 100 feet of MCR steelhead critical habitat in alternative 4 .The effects related to trail crossings and construction within alternative 4 would be less than alternatives 3 and 4 for pool frequency. With implementation of PDCs, there would be a neutral effect to pool frequency from this activity.

The effects of interpretive signage on pool frequency would be the same as alternative 2.

**Table 93. Alternative 4 trails—number of stream crossings in riparian habitat conservation areas (RHCAs) and Mid-Columbia River (MCR) steelhead critical habitat trail, and miles of trail within 100 feet of RHCA categories and MCR steelhead critical habitat**

| Proposed trail | Miles of Trail |
|---|---|
| Total proposed trail | 11.9 |
| New construction | 9.4 |
| Within Nipple Butte Inventoried Roadless Area | 3 |
| **Stream designation** | **Number of stream crossings** |
| Category 1 RHCA | 2 |
| Category 2 RHCA | 4 |
| Category 4 RHCA | 2 |
| Mid-Columbia River steelhead critical habitat | 0 |
| **Stream designation** | **Miles of trail within 100 feet of RHCA and MCR steelhead critical habitat** |
| Category 1 RHCA | 0.27 |
| Category 2 RHCA | 0.71 |
| Category 4 RHCA | 0.08 |
| Mid-Columbia River steelhead critical habitat | 0 |

**Day Use Area North Side Magone Lake** – There would be no development of a north side day use area on Magone Lake and therefore no effect to pool frequency.

**Fish Cribs and Fish Sticks** – The number of fish cribs with alternative 4 would be 5 to 10, which is less than alternatives 2 and 3, and the number of fish sticks is also less than alternatives 2 and 3. The effects described in alternatives 2 and 3 for these activities on pool frequency would be the same for alternative 4 but decrease in intensity.

**Day Use Boat Dock, Campground Boat Mooring** – The effects to pool frequency from installation of a day use boat dock and campground boat mooring would be the same as alternatives 2 and 3. No fishing dock would be placed on Magone Lake for alternative 4.

### Direct and Indirect Effects – Water Temperature and Stream Shading

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The number of acres within silviculture prescriptions and potential danger tree felling is less for alternative 4 than alternatives 2 and 3 (approximately ½ of alternative 2). The number of upland aspen stand treatments is the same through all alternatives except alternative 1. The majority of timber felling activities would occur outside of RHCAs under alternative 4, therefore no meaningfully measureable effects to stream shading and water temperature is expected.

The effects of skyline yarding on pool frequency would be the same as those described in alternatives 2 and 3 but with less intensity due to the decrease in acreage identified for skyline. In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

Felling of danger trees may occur along haul routes that are within 100 feet of Category 1 RHCA streams, and previous field observations suggest 1 to 2 trees per mile. Danger trees felled within the RHCA would be utilized within the RHCA. Danger trees are usually dead and provide little shade especially when surrounded by live trees; considering this as well as the minimal number of danger trees anticipated to be felled, measurable increases in stream temperatures would not likely result from proposed danger tree felling. Additionally, danger trees felled within or into RHCAs would be felled into the stream where feasible or otherwise left within the RHCA. Conifers felled into streams would immediately shade a minor portion of the stream, as well as provide sheltered sites for riparian hardwood growth through reduction of browse by herbivores, which would enhance stream shading in the long term.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The majority of fuels treatment activities would occur outside of RHCAs and would have beneficial effects to aquatic resources by reducing surface fuels, thinning trees, stimulating growth of aspen and other hardwoods, and increasing the canopy base height.

The effects of prescribed burning on stream shading and water temperature are the same as those described for alternatives 2 and 3. With alternative 4, prescribed fire is not proposed within the Nipple Butte IRA and the acres of prescribed burning in the project area decreases. Due to the decrease in prescribed burning adjacent to RHCAs the effects to shade and water temperature are expected to be less than alternatives 2 and 3 with a neutral and not meaningfully measurable effect to shade and water temperature. However, the lack of fire within these areas may result in a more severe wildfire, especially in the Nipple Butte IRA, resulting in a negative and meaningfully measurable effect to shade and water temperature. Therefore, benefits to RHCAs associated with wildfire would not be realized to the extent as that of alternatives 2 and 3, and wildfire could result in negative consequences.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 4, which is the same as alternatives 2 and 3. The effects of temporary road construction on shade and water temperature are the same as those described for alternative 2. Sites requiring the removal of shade-providing trees for temporary road construction are limited in size and frequency. The majority of shade-providing trees removed adjacent to streams occur along intermittent streams, reducing the likelihood that removal of these trees would result in a change in water temperature because intermittent streams go dry before water temperatures in occupied TES/MIS habitat downstream become limiting to fish. The removal of relatively young and short in stature trees associated with temporary roads constructed on existing roadbeds would not occur within pernennial streams and therefore effects to shade and water temperature would not be meaningfully measureable. Additionally there are older taller trees immediately adjacent to the roadbed (not in the roadbed) and stream channels that function as primary shade.

**Stream Crossings and Improvements** – The effects related to road crossings on shade and stream temperature are the same as those discussed under shade and water temperature within alternatives 2 and 3. Within alternative 4 there is a decrease in the number of Category 2 and 4 stream crossings on native surface roads. Therefore, the intensity of the effects associated with stream crossings is less than that of alternatives 2 and 3. Implementation of log haul PDCs (see Appendix C – Project Design Criteria) and BMPs would result in a negative effect on shade and water temperature that is not meaningfully measurable.

The effects of stream crossing improvements to shade and water temperature are the same as those described in alternatives 2 and 3 but with less intensity due to a decrease in the number of RHCA crossings.

**Road Decommissioning and Road Closure** – Road decommissioning actions would not have any immediate effect on shade. Removal of danger trees in RHCAs for decommissioning activities is not anticipated. Conifers and native riparian hardwoods would be planted in decommissioned road segments as part of the decommissioning process. Over the long-term (50 to 70 years), shading would increase beyond baseline as planted conifers become established and grow to a size that provides shading.

The effects of road closures on stream shading and water temperature are the same as those described for alternatives 2 and 3.

**Road Maintenance and Use (includes haul, water drafting)** – Road maintenance and use would have a negative but not meaningfully measurable effect to stream shading and water temperatures because of the likelihood that some hazard trees may be felled adjacent to RHCAs. Water withdrawals for dust abatement during haul activities would occur. Water drafting can occur only as long as supply is adequate to provide for both fish and water withdrawal. The maximum water withdrawal from one site in an 8-hour period would be 18,000 gallons of water. Water withdrawals would be in accordance with the criteria described in the 2010 Malheur National Forest Road Maintenance Biological Assessment and National Marine Fisheries Service guidance, included in Appendix C – Project Design Criteria. Use of these criteria would insure that water withdrawals do not result in a measurable increase in water temperatures.

**Recreation Trail Construction and Interpretive Signage** – The miles of trail within Category 1, 2, and 4 RHCAs in alternative 4 is considerably less than with alternatives 2 and 3. Effects to shade and water temperature described for alternatives 2 and 3 would be the same but to a lesser degree in alternative 4.

No interpretive signage would occur within alternative 4.

***Day Use Area North Side Magone Lake*** – The day use area is not proposed within alternative 4; therefore no effect to stream shade or temperature is anticipated.

**Fish Cribs and Fish Sticks** – The effects of fish cribs and fish sticks on shade and water temperature are the same as those described for alternatives 2 and 3. The intensity of the actions associated with these structures is less than that of alternatives 2 and 3.

**Day Use Boat Dock, Campground Boat Mooring** – The effects of installation of the day use boat dock and campground boat mooring on shade and water temperature in alternative 4 would be the same as described for alternatives 2 and 3.

**Direct and Indirect Effects – Large Woody Debris**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 4, therefore no meaningfully measureable effects to LWD are expected.

The effects of skyline yarding on LWD would be the same as described for alternatives 2 and 3 but with less intensity due to a decrease in acreages from that of alternatives 2 and 3.

The effects of aspen restoration would be the same as described for alternatives 2 and 3 for LWD and the acreage treated remains the same.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – The effects of prescribed burning, piling/burning, and biomass removal on LWD are the same as those described for alternative 2 but to a lesser degree than alternatives 2 and 3 due to the decrease in all of the above proposed activities in alternative 4.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 2. Limiting these activities to areas outside of RHCAs would prevent adverse impacts to existing and future LWD. Effects of temporary roads on LWD are the same as those described for alternative 2. Sites requiring the removal of trees that could be recruited as LWD for temporary road construction are limited in size and frequency, and the majority of trees removed adjacent to streams occur along intermittent streams, upstream of occupied habitat for TES/MIS species. Conifers would be felled into streams where feasible as described above. In most cases, trees that can safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Temporary road construction within RHCAs would have a negative effect on LWD that would not be meaningfully measurable due to the limited number of miles of temporary road and that they are located on former roadbeds.

**Stream Crossings and Improvements** – The effects related to road crossings on LWD are the same as those discussed under LWD for alternatives 2 and 3. With alternative 4 there is a decrease in the number of Category 2 and 4 stream crossings on native surface roads. Therefore the intensity of the effects associated with stream crossings on LWD is less than that of alternatives 2 and 3.

The effects of stream crossing improvements on LWD are the same as those described for alternatives 2 and 3 but with less intensity due to a decrease in the number of stream crossings on native surface roads within RHCAs.

**Road Decommissioning and Road Closure** – The effects of road decommissioning and road closure on LWD are the same as those described for alternatives 2 and 3.The miles of road closure and road decommissioning within 100 feet of RHCAs is the same as alternative 2.

**Road Maintenance and Use (includes haul, water drafting)** – The effects of road maintenance activities on LWD are the same as those described for alternative 2. Activities would not likely result in a reduction of LWD to Category 1, 2, or 4 RHCA stream channels because in most cases, trees that can only safely be felled across the road often lean away from the stream channel and would be less likely to fall into stream channels where they could function as LWD. Where conifers are felled into the stream, they would immediately function as LWD. The effects of this action would be negative for LWD but would not be meaningfully measurable.

**Recreation Trail Construction and Interpretive Signage** – The effects of trail construction on LWD would be the same as described for alternative 2, but at less intensity due to the decrease in trail construction within 100 feet of category 1, 2, and 4 RHCAs, which is less than with alternatives 2 and 3.

No interpretive signage would be installed as part of alternative 4.

**Day Use Area North Side Magone Lake** – The day use area on the north side of Magone Lake would not be constructed with alternative 4.

**Fish Cribs and Fish Sticks** – The effects of fish cribs and fish sticks would be the same as those described for alternatives 2 and 3 but with slightly less of a beneficial effect on LWD.

**Day Use Boat Dock, Campground Boat Mooring** – The effects of LWD from installation of a day use boat dock and campground boat mooring would be the same as described for alternatives 2 and 3.

**Direct and Indirect Effects – Embeddedness and Fine Sediment**

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – The majority of timber felling activities would occur outside of RHCAs under alternative 4, therefore no meaningfully measureable effects to embeddedness and fine sediment are expected. No commercial or non-commercial treatments would occur within RHCAs.

The effects of skyline yarding on embeddedness and fine sediment are the same as those described for alternative 2, but less than alternatives 2 and 3 due to the decrease in skyline acreages. In the unexpected event that skyline corridors would cross streams, full suspension of logs across channels through limited width skyline corridors would filter sediment caused by ground disturbing activities.

Since proposed aspen restoration treatments and danger tree felling do not involve ground-disturbing activities, inputs of fine sediment are not expected to occur.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – Most fuels treatment activities would occur outside of RHCAs. The effects of prescribed fire on embedded and fine sediment would be the same as described for alternative 2, but to a lesser extent than alternatives 2 and 3 due to planned prescribed burning not occurring within the Nipple Butte IRA (units 6 and 7).

Due to the minor extent of moderate severity burning activities and PDCs that would be implemented with this action, moderate severity prescribed burning would not result in delivery of fine sediment to stream channels sufficient to result in meaningfully measureable effects to embeddedness and fine sediment. As invigorated riparian vegetation growth following the reintroduction of fire occurs, fine sediment from upland sources would be filtered and stored in outer portions of RHCAs, resulting in a long-term beneficial effect to embeddedness and fine sediment that is meaningfully measureable.

Beche et al. (2005) conducted intense post-prescribed fire monitoring (e.g., pebble counts, longitudinal profiles, and cross-sections) and observed little to no change in stream sediment composition 1 year post-fire. Similarly, they observed little to no change in stream channel morphology and no substantial change in erosion or deposition in the surveyed reaches (Beche et al. 2005).

Biomass removal would not occur in RHCAs.

**Temporary Roads and Landings** – No landings are proposed within RHCAs under alternative 4. Limiting these ground-disturbing activities to areas outside of RHCAs along with erosion control BMPs, would prevent negative and meaningfully measurable impacts to embeddedness and fine sediment. PACFISH RHCA buffer widths were designed to provide an area to trap fine sediment generated from upslope activities such as timber harvest.

The effects of temporary road construction on fine sediment and embeddedness for temporary roads within Category 1 RHCAs are the same as those described in alternative 2. With implementation of PDCs, construction of most temporary roads on existing road beds would not result in a meaningfully measureable increase in embeddedness and fine sediment.

*Stream Crossing and Improvements* – There are 9 crossings of MCR steelhead critical habitat; 2 are on asphalt, 5 are on crushed aggregate, and 2 are on native surface, which is the same as alternatives 2 and 3. Within Category 1, 2, and 4 RHCAs in the project planning area there are 12 crossings on asphalt, 25 on crushed aggregate, and 43 on native surface (Table 87). Road status for the crossings within each of the RHCA categories for alternative 4 are summarized in Table 89. The effects of native road surface crossings described within alternatives 2 and 3 are decreased by an additional 18 native surface road crossings for haul within Category 2 and 4 RHCAs (closed to open roads) and 1 less temporary road crossing.

Stream crossings on native surface roads may contribute sediment to stream channels resulting in a negative but not meaningfully measurable effect for fine sediment and embeddedness. Designs would consider utilizing dips, outsloping, insloping with a ditch-relief culverts, and/or erosion control on vegetative buffers (slash from roadside brushing, revegetation, coir logs, etc.) in addition to rocking. Implementation of BMPs and PDCs related to these stream crossings, and appropriate drainage features, would result in a beneficial effect that is meaningfully measurable for degraded road crossings and road drainage features. The effects of stream crossings for fine sediment and embeddedness for alternative 4 are the same as described for alternatives 2 and 3, with less intensity.

**Road Decommissioning and Road Closures** – The effects of road decommissioning and road closure for alternative 4 are the same as those described for alternatives 2 and 3 for embeddedness and fine sediment.

**Road Maintenance and Use (includes haul, water drafting)** – Road maintenance would occur at a level commensurate with use, and would include several activities that may potentially result in sedimentation from the road prism to the ditch line or the adjacent slope. Typical road maintenance activities would: blade and shape the road, including existing drainage dips, grade sags, and waterbars; repair damaged culverts and ditches; place rock in some existing drainage dips and grade sags; place rock in wet areas of road; remove brush and danger trees; and apply dust abatement.

The longer term effects of road maintenance are to maintain or improve existing road conditions. Road maintenance may decrease chronic sedimentation in some locations. Improving drainage, removing ruts and rills from the driving surface, and adding less erosive surfacing material would reduce detachment and transport of sediment. This is especially important for roads within RHCAs.

Because road maintenance activities would be commensurate with use, it is possible that if winter logging occurs, little to no road maintenance may be necessary and therefore would not occur. Alternatively, if operations occur in the summer, road maintenance may occur on all or nearly all of the haul roads.

Proposed road maintenance and haul activities in RHCAs would likely result in creation and transport of a negligible amount of fine sediment to stream channels due to loosening of sediment particles and destruction of ground cover. However, PDCs would be implemented during these activities, and are expected to limit fine sediment delivery to streams, keeping amounts reaching stream channels to negligible levels for other than rare precipitation events (negative but not meaningfully measurable).

Water withdrawals for dust abatement during haul would be in accordance with the PDCs, including National Marine Fisheries Service guidance. Use of PDCs for water drafting would ensure that water withdrawals do not result in significant delivery of fine sediment to streams.

**Recreation Trail Construction and Interpretive Site development** – The effects of trail construction for fine sediment and embeddedness are the same as described for alternative 2 but at a much lesser intensity due to the decrease in new trail construction.

**Day Use Area North Side Magone Lake** – Construction of a day use area on the north side of Magone Lake is not proposed for alternative 4.

**Fish Cribs and Fish Sticks** – The effects of fish cribs and fish sticks on fine sediment and embeddedness are the same as described for alternative 2 but to a lesser extent due to a decrease in the number of fish cribs and fish sticks.

**Day Use Boat Dock, Campground Boat Mooring** – The effects to fine sediment and embeddedness from installation of a day use boat dock and campground boat mooring would be the same as described for alternatives 2 and 3.

**Direct and Indirect Effects – Width-to-Depth Ratio and Streambank Stability**

Width-to-depth ratio and streambank stability indicators are grouped since they are affected similarly by project elements.

**Timber Felling (includes silviculture prescriptions, yarding, aspen restoration, and danger tree felling)** – Most timber felling activities would have no effect on width-to-depth ratios or streambank stability due to proximity of most actions away from the stream channel and implementation of PDCs. The possible minor amounts of sediment entering channels and small areas of bank instability would not affect width-to-depth ratios at the site or reach scale. Effects from these actions on width-to-depth ratios would be neutral.

**Fuels Treatments (includes prescribed burning, piling/burning, and biomass removal)** – A minor short-term decrease in stream bank stability would occur as a result of prescribed burning activities in RHCAs until vegetation recovers. However, it is unlikely that burned patches along stream banks would be in sufficient sizes or quantity to result in a meaningfully measureable decrease in bank stability. These impacts would not be of a scale that would result in destabilization of stream channels, thus a neutral effect to width-to-depth ratios from fuels treatments is anticipated. Over the long-term as fire invigorates riparian shrub growth, bank stability would increase in a meaningfully measureable way.

No effects to bank stability or width-to-depth ratios are expected from pile burning and biomass removal due to proximity of these activities away from stream channels.

**Temporary Roads and Landings** – No landings would be within RHCAs. The effects of temporary road construction on bank stability and width-to-detph ratios are the same as those described for alternatives 2 and 3.

**Stream Crossings and Improvements** – The effects of road crossings on bank stability and width-to-depth ratios would be the same as described for alternative 2 but to a lesser extent due to the decrease in the number of crossings within Category 2 and 4 RHCAs.

The effects of stream crossing improvements are the same as described for alternatives 2 and 3, with less intensity than alternatives 2 and 3.

**Road Decommissioning and Road Closures** – Road decommissioning would positively affect bank stability and width-to-depth ratios by obliterating roads that restrict floodplain connectivity. The minor amount of sediment delivered to streams associated with road decommissioning would not affect width-to-depth ratios. Due to the extent and location of treatments, this effect would be positive but not meaningfully measureable.

The effects of road closures on bank stability and width-to-depth ratios are the same as those described for alternatives 2 and 3, with less intensity.

**Road Maintenance and Use (includes haul, water drafting)** – The possible minor amounts of sediment entering channels from road maintenance activities would not affect floodplain connectivity, streambank stability, or width-to-depth ratios at the site or reach scale. A neutral effect is anticipated.

**Recreation Trail Construction Interpretive Signage** – The effects of trail construction would be the same as those described for alternative 2 for bank stability and width-to-depth ratios but to a lesser extent and magnitude because of the decrease in trail crossings of RHCAs and within 100 feet of RHCAs.

No interpretive signage would be installed with alternative 4.

**Day Use Area North Side Magone Lake** – No day use area on the north side of Magone Lake would be constructed with alternative 4

**Fish Cribs and Fish Sticks** – The effects of fish crib and fish stick installation on bank stability and width-to-depth rations would be the same as described for alternative 2 but to a lesser extent because of the reduction in the number of cribs and fish sticks.

**Day Use Boat Dock, Campground Boat Mooring** – The effects to bank stability and width-to-depth ratios related to installation of a day use boat dock and campground boat mooring are the same as described for alternative 2.

### *Cumulative Effects*

Potential effects from alternative 4 would be cumulative with effects from non-federal activities within the project planning area and activities within the aquatic analysis area on federal, state, and private lands. Aside from this project, other non-restoration activities that may contribute to cumulative effects include: timber harvest activities, wildfires, livestock grazing, road use, flood irrigation/water diversion, and vegetation alteration.

Although the aquatic restoration actions covered under the Aquatic Restoration Decision would alleviate degraded conditions within RHCAs, there would be short-term adverse effects to several of the primary habitat elements; primarily fine sediment related to culvert replacement/removal, large and coarse wood placement, log weir and boulder modification, and prescribed fire. These actions directly address altered sediment transport regimes for scour and deposition and riparian vegetative structure resulting in long-term benefits for all fish habitat elements. (See discussion of aquatic restoration effects past, present, and foreseeable activities relevant to cumulative effects analysis above and Table 94 below.)

**Table 94. Summary of effects to the primary habitat elements for all past, ongoing, and foreseeable aquatic restoration actions, such as Aquatic Restoration Decision**

| Aquatic restoration actions | Primary habitat elements | | | | | |
|---|---|---|---|---|---|---|
| | Pool frequency | Water temperature and stream shading | Large woody debris | Embeddedness and fine sediments | Width-to-depth ratio | Bank stability |
| Fish passage restoration (culvert replacement/removal) | NMM (short-term) PMM (long-term) | PNMM | PNMM | NMM (short-term) PMM (long-term) | PMM | NMM (short-term) PMM (long-term) |
| Large wood, boulder, and gravel placement; including tree removal for large wood placement | PMM | NNMM (short-term) PMM (long-term) | PMM | NMM (short-term) PMM (long-term) | PMM | NMM (short-term) PMM (long-term) |
| Dam and legacy structure removal | PMM | PMM | Neutral | NMM (short-term) PMM (long-term) | PMM | NMM (short-term) PMM (long-term) |
| Reduction/relocation of recreation impacts | Neutral | PMM | PMM | PMM | Neutral | PMM |
| Livestock fencing, stream crossings and off-channel livestock watering | Neutral | PMM | Neutral | PMM | PMM | PMM |
| Road and trail erosion | PMM | PMM | PMM | PMM | PMM | PMM |
| Riparian vegetation treatment (controlled burning) | NNMM (short-term) PMM (long-term) | NNMM (short-term) PMM (long-term) | NNMM (short-term) PMM (long-term) | NMM (short-term) PMM (long-term) | Neutral | NMM (short-term) PMM (long-term) |
| Riparian vegetation planting | Neutral | PMM | Neutral | PMM (long-term) | PMM | PMM |
| Beaver habitat restoration | PMM | PMM | Neutral | Neutral | PMM | Neutral |
| Juniper removal | Neutral | PMM | Neutral | NMM (short-term) PMM (long-term) | Neutral | Neutral |

NNMM = Negative, not meaningfully measured; PNMM = Positive, not meaningfully measured; PMM = Positive, meaningfully measured; NMM = Negative, meaningfully measured; N = Neutral

**Table 95. Alternative 2 summary of project element effects of the Magone Project to the primary habitat elements**

| Primary habitat elements | Timber felling | Fuels treatments | Temporary road and landing construction | Stream crossing | Stream crossing improvements | Road decommissioning and closure | Road maintenance and use | Magone Lake aquatic actions | Trails | Recreation (boat and fishing docks) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pool frequency | NNMM<br>PNMM | NNMM | NNMM | NNMM | NNMM | NNMM<br>**PMM** | NNMM | NA | Neutral | NA |
| Water temperature and stream shading | NNMM | NNMM<br>**PMM** | NNMM | NNMM | NNMM<br>PNMM | NNMM<br>**PMM** | NNMM<br>PNMM | PNMM | NNMM | NA |
| Large woody debris | NNMM<br>PNMM | NNMM<br>**PMM** | NNMM | PNMM<br>NNMM | NNMM<br>PNMM | **PMM**<br>PNMM | NNMM | **PMM** | NNMM | NA |
| Embeddedness and fine sediments | NNMM | NNMM<br>**PMM** | **NNMM** | NNMM | NNMM<br>**PMM** | **NMM**<br>**PMM** | NNMM | NNMM | NNMM | NNMM |
| Width-to-depth ratio | Neutral | Neutral | Neutral | Neutral | Neutral | Neutral | Neutral | NA | Neutral | NA |
| Bank stability | NNMM | NNMM<br>PNMM | Neutral | NNMM | NNMM<br>PNMM | **NMM**<br>**PMM** | Neutral | NNMM | NNMM | NNMM |

Actions included under each project element are restated here for reference:

- Timber Felling (includes Silviculture Prescriptions, Yarding, Aspen Restoration, and Danger Tree Felling)
- Fuels Treatments (includes Prescribed Burning, Piling/Burning, and Biomass Removal)
- Temporary Roads & Landings
- Stream Crossing Improvements
- Road Decommissioning (includes Road Construction to facilitate decommissioning)
- Road Maintenance & Use (includes Haul, Water Drafting, Road Closures, & Recreation Interpretive Site Development)

NNMM = Negative, not meaningfully measured; PNMM = Positive, not meaningfully measured; PMM = Positive, meaningfully measured; NMM = Negative, meaningfully measured; N = Neutral

**Table 96. Alternative 3 summary of project element effects of the Magone Project to the primary habitat elements**

| Primary habitat elements | Timber felling | Fuels treatments | Temporary road and landing construction | Stream crossing | Stream crossing improvements | Road decommissioning and closure | Road maintenance and use | Magone Lake aquatic actions | Trails | Recreation (boat and fishing docks) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pool frequency | NNMM | NNMM | NNMM | NNMM | NNMM<br>PNMM | NNMM<br>**PMM** | NNMM | NA | NNMM | NA |
| Water temperature and stream shading | NNMM | NNMM<br>**PMM** | NNMM | NNMM | NNMM<br>PNMM | NNMM<br>**PMM** | NNMM | Neutral | NNMM | |
| Large woody debris | NNMM | NNMM<br>**PMM** | NNMM | NNMM<br>PNMM | PNMM | **PMM** | NNMM | **PMM** | Neutral | |
| Embeddedness and fine sediments | NNMM | NNMM<br>**PMM** | **NMM** | NNMM | NNMM<br>**PMM** | **NMM**<br>**PMM** | NNMM | NNMM | **NMM** | |
| Width-to-depth ratio | Neutral | Neutral | Neutral | Neutral | PNMM | **PMM** | Neutral | NA | Neutral | |
| Bank stability | Neutral | NNMM<br>**PMM** | Neutral | NNMM | PNMM | NNMM<br>**PMM** | Neutral | NNMM | **NMM** | |

Actions included under each project element are restated here for reference:

- Timber Felling (includes Silviculture Prescriptions, Yarding, Aspen Restoration, and Danger Tree Felling)
- Fuels Treatments (includes Prescribed Burning, Piling/Burning, and Biomass Removal)
- Temporary Roads & Landings
- Stream Crossing Improvements
- Road Decommissioning (includes Road Construction to facilitate decommissioning)
- Road Maintenance & Use (includes Haul, Water Drafting, Road Closures, & Recreation Interpretive Site Development)

NNMM = Negative, not meaningfully measured; PNMM = Positive, not meaningfully measured; PMM = Positive, meaningfully measured; NMM = Negative, meaningfully measured; N = Neutral

**Table 97. Alternative 4 summary of project element effects of the Magone Project to the primary habitat elements**

| Primary habitat elements | Timber felling | Fuels treatments | Temporary road and landing construction | Stream crossing | Stream crossing improvements | Road decommissioning and closure | Road maintenance and use | Magone Lake aquatic actions | Trails |
|---|---|---|---|---|---|---|---|---|---|
| Pool frequency | NNMM | NNMM<br>**PNMM** | NNMM | NNMM | NNMM<br>PNMM | NNMM<br>**PMM** | NNMM | NA | Neutral |
| Water temperature and stream shading | NNMM<br>PNMM | NNMM<br>**PNMM** | NNMM | NNMM | NNMM | **PMM** | NNMM | PNMM | Neutral |
| Large woody debris | NNMM<br>PNMM | NNMM<br>**PNMM** | NNMM | NNMM | PNMM | **PMM** | NNMM | PMM | Neutral |
| Embeddedness and fine sediments | NNMM | NNMM<br>**PNMM** | **NNMM** | NNMM | NNMM<br>**PMM** | **NNMM**<br>**PMM** | NNMM | NNMM | NNMM |
| Width-to-depth ratio | Neutral | Neutral | Neutral | Neutral | Neutral | **PMM** | Neutral | NA | Neutral |
| Bank stability | NNMM | **PMM** | Neutral | Neutral | PNMM | NNMM<br>**PMM** | Neutral | NNMM | NNMM |

Actions included under each Project Element are restated here for reference:

- Timber Felling (includes Silviculture Prescriptions, Yarding, Aspen Restoration, and Danger Tree Felling)
- Fuels Treatments (includes Prescribed Burning, Piling/Burning, and Biomass Removal)
- Temporary Roads & Landings
- Stream Crossing
- Road Decommissioning and Road closure
- Road Maintenance & Use (includes Haul, Water Drafting, Road Closures, & Recreation Interpretive Site Development)
- Recreation Trails and Interpretive Signage
- Magone Lake Fish Cribs and Fish Sticks
- Day use area North Side of Magone Lake

NNMM = Negative, not meaningfully measured; PNMM = Positive, not meaningfully measured; PMM = Positive, meaningfully measured; NA= Not Applicable

### *Direct Effects to Species*

The Magone analysis area contains MCR steelhead, redband trout, and westslope cutthroat spawning and rearing habitat. At certain times and under various conditions it is possible for components of six project elements to directly affect MCR steelhead, redband trout, and/or westslope cutthroat trout for embeddedness/fine sediment, pool frequency, and bank stability for the following elements: new recreation trails, road decommissioning, and temporary road construction. Direct effects to MCR steelhead, redband trout, and westslope cutthroat trout from the remaining five project elements are not expected to occur

For project elements requiring work area isolation through PDCs, MCR steelhead, redband trout, Columbia River bull trout, and mussels may be captured and relocated. Direct effects on juvenile salmonids from work area isolation and fish relocation include mechanical injury during capture, holding, or release, and potential horizontal transmission of disease and pathogens and stress-related phenomena. Stress approaching or exceeding the physiological tolerance limits of individual fish can impair reproductive success, growth, resistance to infectious diseases, and survival. Electro-fishing would be used to salvage fish, it would particularly increase stress loads. Harmful effects of electro-fishing include internal and external hemorrhage, fractured spines, and death. Although some fish may die from electro-shocking, fish would only be exposed to stress caused by work area isolation activities once and the fish relocation is only expected to last a few hours. Mussels may be affected similarly to fishes, except that salvage would occur prior to use of electrofishing. In the absence of work area isolation and salvage activities, more fish and mussels would be injured or killed.

In addition, several conservation measures would be implemented to limit stress and mortality during work area isolation and fish relocation. Limiting the activities to the July 15–August 15 in-stream work period would greatly reduce the chance of affecting adult fish, as these periods are designated to avoid times when adult steelhead, redband trout, or westslope cutthroat trout are most likely to be present.

In-water equipment use could temporarily affect steelhead, redband trout, and bull trout, including impacts on redds, smothered or crushed eggs and alevins, blocked migration, and disrupted or disturbed over-summering behavior. MCR steelhead within the John Day Basin are particularly vulnerable during the spring, when adults are migrating and spawning. They are also vulnerable during late spring/early summer when eggs and fry are still present in the substrate. The activities could move juveniles out of over-summering habitats such as deep pools and into inferior habitats. However, because of the seasonal restrictions imposed by in-stream work windows, these effects would be avoided. Mussel salvage would minimize the potential for individuals to be crushed by equipment.

Water withdrawals for dust abatement during haul activities would occur. Water is the only agent that would be used for dust abatement for proposed haul activities. Water drafting could potentially decrease stream flow and thus, the amount of water available for fish. Water drafting could also remove fish from the stream or injure them, if they are held against screens. Water drafting can occur only as long as supply is adequate to provide for both fish and withdrawal. Approved screens would be attached to intake hoses to prevent adverse impacts to fish. National Marine Fisheries Service developed criteria for pump intake screens would be used on all water pump intakes. Screen mesh openings shall not exceed 3/32 inch for woven wire or perforated plate screens, or 0.0689 inch for profile wire screens, with a minimum 27 percent open area. Trucks would be maintained to prevent oil leaks. Loading is done in a manner to minimize overflowing and discharge of wash into streams.

The maximum withdrawal from one site in an 8-hour period would be 18,000 gallons of water. PDCs include the National Marine Fisheries Service criteria and water drafting guidelines from the 2010 Forest Road Maintenance BA, included in Appendix C – Project Design Criteria. These guidelines would prevent the potential harm to fish.

The Magone analysis area also contains habitat for Columbia spotted frogs, which are highly aquatic and rarely found far from permanent water. At certain times and under various conditions it is possible for all project elements to directly affect spotted frogs. Due to the implementation of PDCs, the short-term nature of this risk, the timing of ground-disturbance in- and near-water project activities during dry field conditions (low to moderate soil moisture levels) when spotted frogs are unlikely to be dispersing, and the distance of the vast majority of project sites from permanent water, direct effects on spotted frogs would be minimized.

**Direct and Indirect Effects to Aquatic and Riparian Habitat**

Use of the six primary habitat elements to determine effects to TES species is based upon using the effects of the action on key habitat elements as a surrogate for effects to the species. The premise is that the primary habitat elements depict the biological requirements of the TES species. Since there is a direct relationship between habitat condition and the growth and survival of individual fish and sensitive species at various life stages, the effects of the action on habitat variables can be linked to effects to individuals of the species, and ultimately to an effects determination.

The analysis in the primary habitat elements section evaluated specific key habitat features that correspond to the primary constituent elements (PCEs) of listed species critical habitat. The PCEs are used to describe "those physical or biological features that are essential to the conservation of the listed species." The same sub-set of key habitat features evaluated for effects to PCEs also apply to the analysis of effects to the species. Those primary habitat element/project element combinations for which a conclusion of effect was "**negative and meaningfully measured**" are listed below, and have the potential to adversely affect listed MCR steelhead and designated critical habitat. Negative and meaningfully measurable effects do not meet the Endangered Species Act (ESA) definition of "insignificant" effects and they are not discountable because the effects are likely to occur. Consequently, the effect determination for MCR steelhead and designated critical habitat is "May Affect, Likely to Adversely Affect" (ESA effects); they also May Impact Individuals or Habitat (Region 6 sensitive species effects to redband trout, westslope cutthroat trout, and Columbia spotted frog). These conclusions were found for the following components of the project elements: new recreation trail construction (alternative 3), temporary road construction (alternative 3) and road decommissioning (alternatives 2, 3, and 4) for actions within the Magone Project coupled with aquatic restoration actions for fish passage restoration, LWD additions, and legacy treatments. The indicators for which "negative and meaningfully measured" effects were concluded are:

- Embeddedness and fine sediment

The literature reports that suspended sediment and turbidity influences on fish range from beneficial to detrimental. Elevated total suspended solids (TSS) have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival, but elevated TSS have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Although fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds, chronic exposure can cause a physiological stress response that can increase maintenance energy and reduce feeding and growth.

As suspended fine sediment settles out downstream from the construction areas, minor increases in stream substrate embeddedness occurs. The literature reports that increases in fine sediments in stream substrates can decrease productivity and habitat quality for juvenile salmonids. Significant increases in fine sediment levels reduce interstitial spaces between substrate particles, leads to shifts in invertebrate community structure, fills pools, and can entomb redds. In such cases, eggs are smothered, prey available for rearing juveniles is reduced, and habitat features are lost.

When heavy equipment is operating in the riparian areas or stream, there is also the potential for fuel or other contaminant spills. Operation of bulldozers, excavators, and other equipment requires the use of fuel and lubricants, which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain polycyclic aromatic hydrocarbons, which can be acutely toxic to salmonids at high levels of exposure and can cause acute and chronic sub-lethal effects on aquatic organisms.

The Forest Service would implement a suite of PDCs including those identified in the ARBO that are intended to reduce the short-term effects caused by near instream construction. Limiting instream construction to low flow periods and using sediment control measures greatly reduces the amount of fine sediment and turbidity created by the actions. Refueling and servicing equipment outside the riparian area reduces the chances of spilling toxic fuels and lubricants. Development and implementation of a pollution and erosion control plan limit any potential adverse effects of a toxic material spill by ensuring that spill response materials are on site during all construction activities. Ensuring that all heavy equipment that would operate instream is cleaned and free of leaks would also reduce the introduction of contaminants into the aquatic environment. Several conservation measures also would be implemented to limit stress and mortality during work area isolation and fish/mussel relocation. Limiting the activities to in-stream work periods would greatly reduce the chance of affecting adult fish, as these periods are designated to avoid times when adult salmonids are present.

Project elements except for 1) temporary road and landing construction, and 2) road maintenance and use, timber felling, recreation trail construction and RHCA road crossings would also have Positive and Meaningfully Measureable effects to one or more of the primary habitat elements (Table 95, Table 96, and Table 97).

The effects of foreseeable actions identified for aquatic restoration within the Magone project planning area on the six primary habitat elements are summarized in Table 94. These actions may occur prior to the actions identified for the Magone Project to some extent, and/or within the next 10 years. Because these actions would occur in multi-year phases negative short term effects from these actions may occur asynchronously with those actions identified in the Magone Project.

The Magone Project would partially restore upland forest health and processes, and introduce disturbance related fire effects. Fish habitat in Magone Lake would be improved and recreational opportunities increase. Magone Project actions, in conjunction with reasonably foreseeable aquatic restoration actions, would restore riparian processes and functions resulting in a strong positive effect on aquatic TES/MIS species.

**Effect Determinations**

Effect determinations for TES and MIS species are presented below and summarized in Table 98.

*MCR Steelhead Determinations:*

- Mid-Columbia Summer Steelhead ESA Determination (T): May Affect, Likely to Adversely Affect (LAA) in the short term. Beneficial Effect (BE) in the long-term when combined with foreseeable aquatic restoration actions.
- Mid-Columbia Summer Steelhead Sensitive Species Determination (S): May Impact Individuals or Habitat, but will not cause a loss of viability to the population or species (MIIH) in the short term. Beneficial Impact (BI) in the long-term when combined with foreseeable aquatic restoration actions.
- Steelhead Management Indicator Species Determination (MIS): Continued Viability at the Forest Scale.
- Steelhead Designated Critical Habitat (D): May Affect, Likely to Adversely Affect (LAA) in the short term. Beneficial Effect (BE) in the long-term when combined with foreseeable aquatic restoration actions.

Because this alternative impacts less than 4.6 percent of suitable steelhead habitat across the Forest, the overall direct, indirect, and cumulative effects (discussed below) would result in a small negative trend of habitat in the short-term. The negative effect on habitat would be insignificant at the scale of the Malheur National Forest. This alternative is consistent with the Malheur Forest Plan, and thus continued viability of steelhead is expected on the Malheur National Forest.

The proposed actions within the Magone Project would have a slightly beneficial to neutral effect on habitat conditions for MCR steelhead. Overall, when combined with foreseeable aquatic restoration actions, a significant beneficial result for MCR steelhead critical habitat would occur (Table 94). However, high water temperatures and altered stream channel conditions in untreated stream reaches would likely persist.

*Redband Trout Determinations:*

- Interior Redband Trout Sensitive Species Determination (S): May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species (MIIH) in the short-term. Beneficial Impact (BI) in the long-term.
- Redband Trout Management Indicator Species Determination (MIS): Continued Viability at the Forest Scale.

Because this alternative impacts less than 3.17 percent of suitable redband trout habitat in relation to the distribution throughout the Malheur National Forest, the overall direct, indirect, and cumulative effects would result in a small negative trend of habitat in the short-term. The effect on habitat would be insignificant at the scale of the Forest. As such, implementation of the Magone Project proposed actions may impact individuals or habitat, but would not likely contribute toward federal listing or cause a loss of viability to the population or species at the Forest-scale.

The proposed actions within the Magone Project would have a slightly beneficial to neutral effect on habitat conditions for redband trout. Overall, when combined with foreseeable aquatic restoration actions, a significant beneficial result for redband trout would occur (Table 94). However, high water temperatures and altered stream channel conditions in untreated stream reaches would likely persist.

*Westslope Cutthroat Trout Determinations:*

- Interior Westslope cutthroat trout Sensitive Species Determination (S): May Impact Individuals or Habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species (MIIH) in the short-term. Beneficial Impact (BI) in the long-term.
- Westslope cutthroat trout Management Indicator Species Determination (MIS): Continued Viability at the Forest Scale.

Because this alternative impacts less than 6.5 percent of suitable westslope cutthroat trout habitat in relation to the distribution throughout the Malheur National Forest, the overall direct, indirect, and cumulative effects would result in a small negative trend of habitat in the short-term. The effect on habitat would be insignificant at the scale of the Forest. As such, the implementation of the project may impact individuals or habitat, but would not likely contribute toward federal listing or cause a loss of viability to the population or species at the Forest-scale.

The proposed actions within the Magone Project would have a slightly beneficial to neutral effect on habitat conditions for westslope cutthroat trout. Overall, when combined with foreseeable aquatic restoration actions, a significant beneficial result for westslope cutthroat trout would occur (Table 94). However, high water temperatures and altered stream channel conditions in untreated stream reaches would likely persist.

*Columbia Spotted Frog Determination:*

- Columbia Spotted Frog Sensitive Species Determination (S): May Impact Individuals or Habitat, but would not likely contribute toward federal listing or loss of viability to the population or species (MIIH) in the short term. Beneficial Impact (BI) in the long-term.

Because this alternative impacts a small percentage of suitable spotted frog habitat on the Malheur National Forest, the overall direct, indirect, and cumulative effects would result in a small negative trend of habitat in the short-term. The effect would be insignificant at the Forest scale. The action alternatives may impact individuals or habitat, but would not likely contribute toward federal listing or loss of viability to the population or species at the Forest-scale.

The proposed actions within the Magone Project would have a slightly beneficial to neutral effect on habitat conditions for Columbia spotted frog. Overall, when combined with foreseeable aquatic restoration actions, a significant beneficial result for Columbia spotted frog would occur in the long-term (Table 94). However, high water temperatures and altered stream channel conditions in untreated stream reaches would likely persist.

### *Cumulative Effects*

#### Aquatic Habitat

The cumulative effects boundary is the same as the aquatic analysis area. Past and ongoing actions are described in this DEIS (Table 13). Effects of the past and ongoing actions are described in the affected environment section above:

- Effects of past and ongoing actions
- General existing stream conditions
- The affected environment sub-sections for pool frequency, large woody debris, bank stability, embeddedness/fine sediment, width-to-depth ratio, and water temperature/stream shading.

Effects are mostly due to roads and road/stream crossings, past grazing, and past riparian harvest. Lesser effects may be due to current grazing, irrigation withdrawals (temperature), riparian firewood cutting (LWD), and fish passage/habitat restoration projects (sediment).

The aquatic habitat and water quality effects of future activities described in this DEIS are negligible, except for the ongoing actions mentioned in the preceding paragraph and those Magone Project actions identified within Table 95, Table 96, and Table 97 above, which were found to have negative and meaningfully measurable effects. The effects of use and maintenance of roads that are not decommissioned would remain about the same as at present The negative effects of fish passage/habitat restoration projects decreases after instream work is finished, and would likely be negligible within 2 years after implementation (Table 94). The positive effects probably would last for decades.

With full implementation of Malheur Forest Plan grazing standards there is little likelihood of cumulative effects from grazing since these standards are designed to allow a near natural rate of recovery of aquatic habitat and riparian vegetation. The current grazing standards are designed to eliminate any effects on aquatic habitats that could carry over to the following year.

If a severe crown fire occurs, shade would be reduced, 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 increase for perhaps 10 years, until evapotranspiration recovers. The risk of this occurring is greater in alternative 4 and the no action alternative (alternative 1).

The no action alternative would permit natural slow, partial recovery from effects of past grazing, past riparian road construction, and past riparian harvest but not past fire suppression activities. This recovery would occur as riparian trees grow larger, as large wood falls into the streams, as channel types change to more stable, narrow configurations, as sediment from past actions is flushed out of stream substrates, and as riparian shrubs and sedges recover and contribute to more stable stream banks. Recovery would be only partial because ongoing impacts from some past land management activities, particularly past riparian road maintenance and construction, would not permit full recovery nor restore physical processes that facilitate recovery.

The analysis of effects of nine grouped project elements on the six primary habitat elements determined that new recreation trail construction (alternative 3) , temporary road construction (alternatives 2, 3, and 4), and road decommissioning would have a negative and meaningfully measurable effect on the primary habitat element of embeddedness and fine sediment. The analysis determined that the effect of the remaining five project elements on the remaining five primary habitat elements was either negative and not meaningfully measurable, positive and not meaningfully measurable, or neutral.

Project elements for fuels treatments, stream crossing and road drainage improvements, and road decommissioning would have positive and meaningfully measureable effects to one or more of the primary habitat elements (Table 95, Table 96, and Table 97). Foreseeable aquatic restoration activities (Table 94) in the project planning area would have short-term negative and meaningfully measurable effects but result in long-term benefits resulting in positive and meaningfully measurable effects on the primary habitat elements.

**Combined Effects from Past, Proposed, Ongoing and Foreseeable Actions**

Common sources of sediment within the analysis area include both natural processes, such as channel erosion, and past and ongoing actions on both National Forest and private lands, such as channel and floodplain modification from logging, livestock grazing (especially past grazing), and roads/culvert crossings. The analysis of effects determined that new recreation trail construction (alternative 3), temporary road construction (alternatives 2, 3, and 4) and road decommissioning, and foreseeable aquatic restoration actions identified in Table 94 would have a short-term negative and meaningfully measurable effect on embeddedness and fine sediment.

Ongoing grazing activities could potentially contribute sediment to streams. The effect of the remaining five project elements on the remaining five primary habitat elements was either negative and not meaningfully measurable, positive, or neutral, except trails has a not meaningfully measurable effect on bank stability in alternative 3. It is unlikely that these project elements would result in measurable adverse cumulative effects when considered with range management activities. Sediment production by new recreation trail construction (alternative 3), temporary road construction (alternative 3). Road decommissioning, and foreseeable aquatic restoration actions identified in Table 94 may result in short-term increases in fine sediment. However, the level of these cumulative effects with grazing management activities is not likely to reach a point where measurable adverse effects would occur where grazing standards are met.

However it is unlikely that these increases would result in cumulative adverse effects when combined with past, ongoing, or future actions. This is because sediment production generated by the project elements listed above would be a small proportion of the total sediment from natural processes and from past and ongoing actions. Design criteria for the project would limit sediment delivery to streams. Thus the cumulative effects of the Magone Project would be a relatively small, short-term increase in total sediment production.

Four of the project elements (fuels treatments, stream crossing improvements, road decommissioning, and fish cribs/fish sticks) would have positive and meaningfully measurable effects to 1 or more of the primary habitat elements. All other elements except for temporary road and landing construction, new trail construction (alternative 3), road maintenance and use, and timber felling would have Negative and not Meaningfully Measureable effects or neutral effects to one or more of the primary habitat elements.

All action alternatives of the Magone Project in conjunction with aquatic restoration actions would restore upland and riparian processes and functions resulting in positive effects on aquatic TES species. The cumulative effects of these actions when combined with the effects of past, ongoing, and foreseeable actions are expected to offset the negative effects described in the preceeding paragraphs and result in significant beneficial cumulative effects to species habitat considered in the biological evaluation. A strong positive response in populations of MCR steelhead, redband trout, westslope cutthroat trout, and Columbia spotted frog. This project is consistent with Malheur Forest Plan and PACFISH objectives, and is expected to achieve those objectives in treated areas where not currently met.

### *Threatened, Endangered, and Region 6 Sensitive and Management Indicator Species Effects Summary*

The following is a summary of both threatened, endangered, and R6 sensitive (TES) species and management indicator species (MIS) effects determinations for alternatives documented from the Aquatic Biological Evaluation for the Magone Project (Table 98).

**Table 98. Aquatic threatened, endangered, and Region 6 sensitive species, and management indicator species with effects determinations by alternative**

| Aquatic species | Status | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| Mid-Columbia River steelhead *Oncorhynchus mykiss* | T, S, MIS | NE<br>NI | LAA - BE<br>MIIH - BI | LAA - BE<br>MIIH - BI | LAA - BE<br>MIIH - BI |
| Mid-Columbia River steelhead Designated critical habitat | D | NE | LAA - BE | LAA - BE | LAA - BE |
| Interior redband trout *O. mykiss gairdneri* | S, MIS | NI | MIIH - BI | MIIH - BI | MIIH - BI |
| Westslope cutthroat trout *Oncorhynchus clarki lewisi* | S, MIS | NI | MIIH - BI | MIIH - BI | MIIH - BI |
| Columbia spotted frog *Rana luteiventris* | S | NI | MIIH - BI | MIIH - BI | MIIH - BI |

Note:

- Federal listing status abbreviations: T = Federally threatened; S = Sensitive species from Regional Forester's list; MIS = Management indicator species; D = Designated critical habitat; and P = Proposed critical habitat.
- Threatened and endangered species effects determinations abbreviations: NE = No Effect; NLAA = May Effect, Not Likely to Adversely Affect; LAA = May Effect, Likely to Adversely Affect; and BE = Beneficial Effect.
- Sensitive species determinations abbreviations: NI = No Impact; MIIH = May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species; WIFV = Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species; and BI = Beneficial Impact.
- Designated critical habitat effects determinations abbreviations: NE = No Effect; LAA = May Effect, Likely to Adversely Affect; and NLAA = May Effect, Not Likely to Adversely Affect.

## 3.8.2.7 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

### *Malheur Forest Plan*

#### Alternative 1

Alternative 1 (no action) does not fully meet the MA–3B standards, and PACFISH standards and guidelines. Alternative 1 is not consistent with the following Malheur Forest Plan standards:

- MA–3B Standard 41: "…Minimize the density of opens roads in this management area by obliterating, revegetating, or closing unnecessary roads or any roads causing significant resource damage."

- PACFISH Standard RF – 3c: Determine the influence of each road on riparian management objectives (RMOs). Meet RMOs and avoid adverse effects on inland native fish by:
    - Closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to anadromous native fish in priority watersheds, and the ecological value of the riparian resources affected.

Degraded aquatic habitat conditions that have known adverse impacts to aquatic resources would remain in their current condition under alternative 1.

**Alternatives 2, 3, and 4**

Alternatives 2, 3, and 4 are consistent with the following applicable MA 3B and PACFISH standards:

- PACFISH RM-1: Design, construct, and operate recreational facilities, including trails and dispersed sites, within riparian habitat conservation areas (RHCAs) in a manner that contributes to attainment of the RMOs. For existing recreation facilities inside RHCAs, assure that RMOs are met. Where RMOs cannot be met, require relocation or closure of recreational facilities.
- PACFISH RM-2: Adjust dispersed and developed recreation practices that are inconsistent with attainment of RMOs. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.
- MA-3B Standard 48: Construct and maintain trails to prevent environmental damage. Design reconstruction projects to mitigate sediment.
- MA-3B Standard 2: Limit and distribute use as necessary to protect and /or rehabilitate areas.
- MA-3B Standard 4: Meet visual quality objectives ranging from retention to modification depending on the visual quality objective of adjacent lands.
- PACFISH RF-2b: Proposed temporary roads and landings/staging areas in RHCAs are minimized.
- PACFISH RF-3a & b: Roads that will be used for proposed vegetation management activities will have drainage problems repaired and will be brought up to standards prior to haul.
- PACFISH RA-2: Danger trees felled in RHCAs and outside of the road way will be left on site where woody debris objectives are not being met.
- Forest Plan DFCs/RMOs: Activities proposed under alternatives 2, 3, and 4 would not retard the attainment of RMOs for aquatic habitat (LWD, replacement LWD, pool frequency, bank stability, width-to-depth ratio, sediment/substrate, shading, and water temperature). Design criteria will be used to minimize the amount of fine sediment resulting from proposed activities.
- Design prescribed burn projects and prescriptions to contribute to the attainment of RMOs (PACFISH Standard FM-4).
- Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs unless there are no other alternatives. Refueling sites within a RHCA must be approved by the Forest Service and have an approved spill containment plan (PACFISH Standard RA-4).

- Locate water drafting sites to avoid adverse effects to listed anadromous fish and instream flows, and in a manner that does not retard or prevent attainment of RMOs (PACFISH Standard RA-5).
- Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of RMOs, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to log-term ecosystem function, listed anadromous fish, or designated critical habitat (PACFISH Standard FM-1).

### *Clean Water Act*

All alternatives comply with the Clean Water Act and the Malheur Forest Plan, since none raise water temperatures, and since all follow Best Management Practices (BMPs) as specified in "Forest Service R6 General Water Quality Best Management Practices" (1988), and in standards and guidelines in the Malheur Forest Plan. The site specific BMPs are listed in Appendix C, in PACFISH standards and guidelines (as described earlier in the Regulatory Framework section), and in standard timber sale contracts.

### *Endangered Species Act*

The Endangered Species Act (ESA) requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) if a proposed activity may affect the population or habitat of a listed species. Federally listed fish species and their designated critical habitat in the project area subject to consultation include Mid-Columbia River (MCR) steelhead and their designated critical habitat. The Malheur National Forest has initiated ESA section 7 consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service on the actions proposed as part of the Magone Project, and will provide the regulatory agencies with a biological assessment regarding effects of the project to threatened Mid-Columbia River steelhead and their designated critical habitats. The completed biological assessment and consultations will be located in the project record.

### *Floodplains (Executive Order 11988)*

Executive Order 11988 says that Federal agencies shall avoid direct adverse effects to floodplains or minimize potential harm. Floodplains greater than 300 feet wide with a gradient of less than 3 percent occur along portions of East Fork Beech Creek, McClellan Creek, Clear Creek, and Tinker Creek within the aquatic analysis area. These areas within wide valley bottoms are recognized as MSRA (most sensitive riparian areas) for their depositional features related to MCR steelhead spawning and water storage. The floodplains are well within RHCAs, and so all alternatives avoid adverse effects to the floodplains, and thus are consistent with Executive Order 11988.

### *Recreational Fisheries*

#### **Alternative 1**

Alternative 1 (no action) would maintain the current degraded aquatic habitat conditions. The current aquatic habitat conditions are resulting in reduced recreational fishing opportunities.

**Alternative 2, 3, and 4**

Alternatives 2, 3, and 4 include the placement of fish habitat improvement structures (fish cribs and fish sticks) within Magone Lake. Alternatives 2, 3, and 4 also include improvements in the existing boat landing and campground boat mooring dock. These actions would improve quantity, function, sustainable productivity, and distribution of recreational fisheries by reducing impacts from elevated levels of fine sediment as directed under Executive Order 12962, Recreational Fisheries.

Alternative 3 includes the placement of a new floating fishing dock on the east side of Magone Lake in association with fish habitat improvement structures. This action would improve the distribution of recreational fisheries by reducing impacts from elevated levels of fine sediment related to shoreline vegetation trampling as directed under Executive Order 12962, Recreational Fisheries.

*Other Relevant Mandatory Disclosures*

**Irreversible and Irretrievable Commitments of Resources**

Irreversible effects are not expected. Reduced population viability for MCR summer-run steelhead, Westslope cutthroat trout, redband trout, and Columbia spotted frog is not expected. PACFISH established explicit goals and objectives for anadromous fish habitat condition and function. By following PACFISH standards and guidelines as well as design criteria specific to this project, it is believed that irretrievable commitments of this resource can be avoided. The goal is to achieve a high level of habitat diversity and complexity through a combination of habitat features.

# 3.9 Analysis Issue – Wildlife

## 3.9.1 Regulatory Framework

Three principal laws most relevant to the Forest Service for wildlife management are the National Forest Management Act (NFMA) of 1976, the Endangered Species Act (ESA) of 1973, and the Migratory Bird Treaty Act (MBTA) of 1918. Direction relative to wildlife follows:

- NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native wildlife species and conserve all listed threatened or endangered species populations (36 CFR 219.19).
- ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems upon which they depend. Forests are required to consult with the U.S. Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed species.
- MBTA established an international framework for the protection and conservation of migratory birds. This act makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird.”

Forest Service Manual direction provides additional guidance to identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species (FSM 2670.31 (6)). This manual directs the Regional Forester to identify sensitive species for each national forest where species viability may be a concern. On December 9, 2011, Regional Forester Kent Connaughton released an updated sensitive species list that includes federally listed, federally proposed, and sensitive species lists. The Regional Forester's Special Status Species list, December 2011, was used to determine threatened, endangered, and Region 6 sensitive (PETS) wildlife species discussed in this document.

Regional Forester's Amendment 2 (Eastside Screens) established interim wildlife standards for old growth, old growth connectivity, snags, large down logs, and northern goshawks. The Regional Forester has periodically distributed letters clarifying direction in Amendment 2 (Regional Forester, October 2, 1997; October 23, 1997; June 11, 2003).

Additional management direction is provided for conservation of migratory landbirds. This direction is consolidated in the Forest Service Landbird Strategic Plan and further developed through the Partners in Flight Program. The Oregon-Washington Partners in Flight Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000) identifies priority bird species and habitats for the Blue Mountains in Oregon.

The principal policy document relevant to wildlife management on the Forest is the 1990 Malheur National Forest Land and Resource Management Plan, referred to as the Malheur Forest Plan for the remainder of this section. The Malheur Forest Plan provides standards and guidelines for management of wildlife species and habitats. Standards and guidelines are presented at the Forest level (USDA Forest Service 1990a, pages IV–26 to IV–33) or Management Area level (USDA Forest Service 1990a, pages IV–50, IV–53, IV–56 to IV–57, IV–105 to IV–107, and IV–108).

## 3.9.2 Analysis Methods

Effects on wildlife species and habitat were assessed within national forest lands in the Magone project planning area, focusing on the implementation of actions described within each alternative. Some wildlife habitats require a detailed analysis and discussion to determine potential effects on a particular species. Other habitats may either not be impacted or are impacted at a level which does not influence the species or their occurrence.

Effects were analyzed within the context of the Magone project planning area, unless otherwise noted. The cumulative effects analysis area for wildlife species is variable depending on the extent and distribution of species and associated habitat that may be affected by activities proposed in the Magone Project.

Species presence/absence determinations were based on one or a combination of the following: habitat presence, review of wildlife sightings recorded in District and Forest wildlife databases, the National Resources Information System wildlife database, non-Forest Service databases, Oregon Department of Fish and Wildlife reports, as well as notes, maps, and summary reports of wildlife observations made during field reconnaissance, and status/trend and source habitat trend documented for the Interior Columbia Basin.

There is a high confidence level that species discussed in this document are currently present, or their habitat is present, in the project planning area. However, formal wildlife surveys were not conducted for most species and data gaps may include a lack of on-the-ground snag and dead and downed wood surveys (information for this analysis was based on DecAID), project scale northern goshawk surveys (not required), and survey data for difficult to access areas.

The Regional Forester's Special Status Species List, December 2011, was used to determine sensitive wildlife species discussed in this document. Conservation status, trends, and source habitats for these and other species were obtained from the Oregon Biodiversity Information Center "Rare, Threatened and Endangered Species of Oregon" (October 2010), NatureServe Explorer (accessed 2014), U.S. Fish and Wildlife Service Birds of Conservation Concern (USDI FWS 2008a), and viability assessments for the Blue Mountain Forest Plan Revision (Wales et al. 2011).

The duration of effects on the wildlife resource is described generally according to the following terms and definitions unless otherwise noted:

- Immediate – Approximately one growing season or several months or less
- Short-term – 0 to 5 years
- Mid-term – 5 to 25 years
- Long-term – 25+ years

Direct, indirect, and cumulative effects of activities proposed in each alternative are identified and discussed.

Rather than addressing all wildlife species, the Malheur Forest Plan focuses on four categories of wildlife: proposed, endangered, threatened, and sensitive (PETS) species; management indicator species (MIS); featured species; and landbirds, including neotropical migratory birds. Old-growth and late and old forest structure as it pertains to wildlife habitat is also discussed. Categories are summarized below:

- **Proposed, Endangered. Threatened, and Sensitive (PETS) Species** – This analysis uses the December 2011 Regional Forester's Special Status Species List.
- **Management Indicator Species (MIS)** – Rocky Mountain elk represent big game species. American (pine) marten, pileated woodpecker, and three-toed woodpecker represent old growth habitats. Primary cavity excavators (mostly woodpeckers) represent dead wood habitat. Effects to MIS species are discussed in the MIS section.
- **Old Growth and Late and Old Forest Structure (LOS) Network** – Management Area 13, and LOS and how these habitats are connected.
- **Featured Species** – The featured species associated with the project planning area are blue grouse and osprey. Additionally, the northern goshawk is analyzed in this section as a result of its inclusion in the Regional Forester's Eastside Forest Plan Amendment 2 (Eastside Screens). Upland sandpiper, California bighorn sheep, pronghorn antelope, and greater sage grouse are featured species that do not occur within the Magone project planning area.
- **Landbirds including Neotropical Migratory Birds (NTMB)** – These species and associated habitat are discussed in the Migratory and Resident Birds section.

### 3.9.3 Proposed, Endangered, Threatened, and Sensitive Species

A proposed species is an animal or plant species that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act. An endangered species is an animal or plant species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range. A threatened species is an animal or plant species listed under the Endangered Species Act that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A sensitive species is an animal or plant species identified by the Forest Service Regional Forester (Region 6) for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Forest Service Manual 2672.4 requires the Forest Service to review all of its planned, funded, executed, or permitted programs and activities for possible effects on proposed, endangered, threatened, and sensitive (PETS) species. The U.S. Fish and Wildlife Service provided a list of PETS that potentially occur in Grant County for consideration in this analysis (USDI FWS 2014). There is no designated or proposed critical habitat for threatened or endangered terrestrial species in the affected subwatersheds.

Nineteen (19) species on the 2011 Regional Forester's Sensitive Species list occur on the Malheur National Forest (Table 99). Although Canada lynx, as listed in Table 99, may have potential habitat on the Forest, the species is not considered to occupy territory on the Forest. Eleven (11) of these species have documented suitable or marginal habitat within the vicinity of the project planning area and warrant further analysis (Table 99). These PETS species are gray wolf, Townsend's big-eared bat, fringed myotis, pallid bat, bufflehead, American peregrine falcon, bald eagle, Lewis's woodpecker, white-headed woodpecker, Johnson's hairstreak, and silver-bordered fritillary.

The U.S. Fish and Wildlife Service is currently reviewing one avian species, black-backed woodpecker, with documented habitat within the project planning area, to determine if listing two populations that occur in Oregon as either subspecies or distinct population segments under the Endangered Species Act is warranted (USDI FWS 2013b).

**Table 99. Species and habitat occurrence for proposed, endangered, threatened, and Regional Forester's sensitive species (PETS)**

| Species common name/ scientific name | Habitat requirements | Status | Species/habitat occurrence |
|---|---|---|---|
| Canada lynx<br>*(Lynx canadensis)* | Primary habitat in sub-alpine fir, lodgepole forest. No critical habitat mapped in Oregon. | T | HN/N* |
| Gray wolf<br>*(Canis lupus)* | Habitat generalist. | S | HD/N |
| Pygmy rabbit<br>*(Brachylagus idahoensis)* | Strongly associated with dense tall Big sagebrush and deep friable soils. | S | HN/N |
| California wolverine<br>*(Gulo gulo luteus)* | Alpine tundra, subalpine cirque basins for denning. Scavenger in diverse habitats during dispersal. | S/C | HN/N<br>(dispersal only) |
| Pallid bat<br>*(Antrozous pallidus)* | Desert grasslands and shrub-steppe with rock outcrops. Uses rock crevices/caves. | S | HD/S |

| Species common name/ scientific name | Habitat requirements | Status | Species/habitat occurrence |
|---|---|---|---|
| Townsend's big-eared bat *(Corynorhinus townsendii)* | Desert shrub, juniper, and pine forests. Associated with caves, mines, and buildings. | S | HD/S |
| Fringed myotis *(Myotis thysanodes)* | Most habitat types, forested, riparian. Roosts in caves, crevices, bridges, mines, and large conifer snags. | S | HD/S |
| Wallowa rosy finch *(Leucosticte tephrocotis wallowa)* | Alpine basins above timberline. | S | HN/N |
| Grasshopper sparrow *(Ammodramus savannarum)* | Grasslands and bunchgrass prairies. | S | HN/N |
| Upland sandpiper *(Bartramia longicauda)* | Montane meadows >1,000 acres. | S | HN/N |
| Bufflehead *(Bucephala albeola)* | Nests in cavities near high mountain lakes surrounded by open woodlands. Open waters on major rivers and lakes outside of the breeding season. | S | HD/S |
| Greater sage grouse *(Centrocercus urophasianus)* | Sagebrush obligate. Leks in openings in sagebrush. Needs grasses for nesting. | S | HN/N |
| Bobolink *(Dolichonyx oryzivorus)* | Mowed moist meadows, grasses, sedges, forbs with mesic shrubs. Irrigated hay fields. | S | HN/N |
| American peregrine falcon *(Falco peregrinus anatum)* | Nests on cliffs >75 feet high. | S, DL | HD/N |
| Bald eagle *(Haliaeetus leucocephalus)* | Large bodies of water. Large conifers for nesting. Winter roost present in adjoining watershed. | S, DL | HD/D |
| Lewis' woodpecker *(Melanerpes lewis)* | Open forests, Ponderosa pine savannah. Nests in large snags in cavities created by other cavity nesters or in very soft snags. | S | HD/D |
| White-headed woodpecker *(Picoides albolarvatus)* | Open ponderosa pine forests with large trees and snags in large patches. | S | HD/D |
| Johnson's hairstreak *(Callophrys johnsoni)* | Western dwarf mistletoe in large ponderosa pine. | S | HD/S |
| Silver-bordered fritillary *(Boloria selene)* | Open wet meadows and bogs. | S | HD/N |

*There is no designated or proposed critical habitat for Canada lynx in the affected area. Based upon the National Lynx Survey, the Malheur National Forest falls under the designation of "Unoccupied Mapped Lynx Habitat" (USDI FWS 2006). There is no effect (NE) expected to Canada lynx.

**Table 100. Species status abbreviations and species/habitat occurrence**

| Status | | Species/habitat occurrence | |
|---|---|---|---|
| E | Federally Endangered | HD | Habitat documented or suspected within the project planning area or near enough to be impacted by project activities |
| T | Federally Threatened | HN | Habitat not within the project planning area or affected by its activities |
| DL | Federally Delisted | D | Species documented in general vicinity of project activities |
| S | Regional Forester's Sensitive Species List | S | Species suspected in general vicinity of project activities |
| C | Endangered Species Act Candidate Species | N | Species not documented and not suspected in general vicinity of project activities |

### 3.9.3.1 Gray Wolf

*Existing Conditions for Gray Wolf*

The Northern Rocky Mountain distinct population segment (DPS) of the gray wolf population includes a portion of eastern Oregon—east of the centerline of Highway 395 and Highway 78 north of Burns Junction and that portion of Oregon east of the centerline of Highway 95 south of Burns Junction (USDI FWS 2008b). A final rule published by the U.S. Fish and Wildlife Service on May 5, 2011 (Federal Register Vol. 76, No. 87) delisted wolves in the Northern Rocky Mountain DPS). Wolves in this eastern third of Oregon (east of Highway 395) were returned to Oregon Department of Fish and Wildlife (ODFW) management. The U.S. Forest Service designates the status of gray wolves as “sensitive.” Wolves west of Highway 395 (outside of the Northern Rocky Mountain DPS) remain protected by the federal Endangered Species Act with the U.S. Fish and Wildlife Service as the lead management agency for these populations. The Magone project planning area lies east of Highway 395 and falls under ODFW management; therefore, the gray wolf will not be analyzed as an endangered species for this project.

Historically, wolves occupied all habitats of the Malheur National Forest (Wisdom et al. 2000). In 1999, a radio-collared wolf from Idaho was confirmed near the Middle Fork John Day River on the Malheur National Forest. Two radio-collared individuals made their way south through Grant County in 2011.

The entire Magone project planning area would be potential foraging or dispersal habitat for gray wolves. The estimated wolf population for the state of Oregon is 64 wolves, in eight packs, with those packs concentrated in northeastern Oregon (ODFW 2014). On December 15, 2014, two wolves were documented by ODFW biologists in Grant and Umatilla Counties and an Area of Known Wolf Activity was designated. Although wolves have been documented on the Forest, there are no confirmed gray wolf denning or rendezvous sites.

### *Effects to Gray Wolf*

**Alternatives 1, 2, 3, and 4 – Direct and Indirect Effects**

Informal consultation with ODFW and the U.S. Fish and Wildlife Service was conducted for management activities on the Malheur National Forest. The two management agencies recommended that the Malheur National Forest follow guidelines described in the *The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho Final Environmental Impact Statement (FEIS)* (USDI FWS 1994) when considering effects to the gray wolf.

The FEIS defines occupied gray wolf range as follows: "areas of confirmed presence of resident breeding packs or pairs of wolves are areas consistently used by > 1 resident wolf or wolves over a period of at least one month" (USDI FWS 1994, page 76). Confirmation of wolf presence is to be made or corroborated by the U.S. Fish and Wildlife Service and ODFW. Until an active pack or confirmed pair are identified within the Magone project planning area, there would be no effect to gray wolves as a result of the proposed project.

Currently a no impact (NI) determination is recommended by ODFW for projects within the Malheur National Forest (east of Hwy 395). Therefore there would be no direct, indirect, or cumulative effects to wolves as a result of alternatives 1, 2, 3, or 4. If a pack (i.e., pair) is identified in the project planning area, the only land use restriction would be limiting the operating period around den sites, which would be coordinated with ODFW.

Additionally, gray wolves are highly adaptable; therefore, management activities would be expected to have little effect on habitat use. Analysis for elk can be found in the Management Indicator Species – Rocky Mountain Elk section, and concludes that implementation of the Magone Project may impact elk distribution at the local level but would not affect elk viability at the Forest level, therefore adequate prey would remain for gray wolves.

**Cumulative Effects**

Because no direct or indirect effects are anticipated as a result of the action alternatives, there would be no cumulative effects to gray wolves.

## 3.9.3.2 Townsend's Big-Eared Bat, Pallid Bat, and Fringed Myotis

### *Existing Conditions for Bats*

Although there are differences between these three bat species, threats in common include loss of roost habitat (snags) and degradation of foraging habitat. Therefore the effects for all three bat species are combined as one discussion.

*Townsend's Big-Eared Bat*—Roost habitat includes caves, mines, hollow trees, and man-made structures (Woodruff and Ferguson 2005). Snags and large trees may be important roosts for this species, although maternity colonies and winter hibernacula are usually associated with caves, mines, or buildings (Woodruff and Ferguson 2005). In eastern Oregon, ponderosa pine, mixed conifer forest, and riparian-wetland habitat is used by Townsend's big-eared bats. The bats forage in and around foliage at mid and upper canopy levels where they generally capture insects in the air.

Threats include disturbance or destruction of roost sites, loss or degradation of water sources and foraging areas, and exposure to pesticides or other toxic chemicals.

Townsend's big-eared bats are documented for the Malheur National Forest. Rock crevice, large tree and snag, and foraging habitat occur within the project planning area.

*Pallid Bat*—Habitat for pallid bats in Oregon includes drier shrub/steppe habitat and grasslands, often near rocky outcrops and water. Open ponderosa pine forest with cliff habitat is also used (Ferguson and Azerrad 2004, NatureServe 2012). Roosts include rock crevices, buildings, under bridges, and under rock overhangs. Rock piles, hollow trees, and cavities in ponderosa pine are also used (Verts and Carraway 1998). Pallid bats forage for arthropods and insects off the ground; their diet is composed of beetles, moths, crickets, scorpions, centipedes, and an occasional lizard or small rodent (Verts and Carraway 1998).

Within the Magone project planning area, roost habitat exists in small bridges, rock outcrops, hollow trees, and cavities within ponderosa pine. Foraging habitat within the project planning area occurs in sagebrush, juniper woodland, and grassland, particularly in the Nipple Butte Inventoried Roadless Area.

*Fringed Myotis*—Fringed myotis use a fairly broad range of habitats and, in eastern Oregon, appear to prefer forested and riparian areas (Csuti et al. 2001). Roost habitat includes caves, mines, cliffs, buildings, and snags. Suitable tree roosting habitat contains late successional ponderosa pine with high-density clusters of snags in early to medium stages of decay (Keinath 2004). Foraging habitat includes a heterogeneous mix of conifer forest, including ponderosa pine, Douglas-fir, and shrubland/grassland, with ample water sources and an abundance of insect prey (Keinath 2004).

Threats include disturbance or destruction of roost sites, loss or degradation of water sources and foraging areas, and exposure to pesticides or other toxic chemicals.

Fringed myotis are documented for the Malheur National Forest. Within the project planning area, rock crevice, snag, and foraging habitat occur.

**Bat Habitat**

Potential roost habitat includes large trees with dead tops, cracks, or cavities; large hollow trees; and large snags. A watershed analysis of snags was done for the Magone project planning area and can be found in the Management Indicator Species section of this report under Dead and Defective Habitat. Therefore, the remainder of this analysis will focus on roost habitat within live trees and foraging habitat.

The highest potential roost habitat within live trees would occur in old forest (old forest multi strata and old forest single stratum). Acres of this tree roost habitat occur on approximately 8,856 acres (32.8 percent) of the project planning area.

A diversity of foraging habitat is also important for these three bat species. Unique habitats such as aspen stands increase the diversity of available forage habitat and attract insects that bats rely on. Healthy riparian vegetation also increases insect diversity and abundance, which is important for bats. Within the project planning area there are approximately 24 acres of aspen and 4,200 acres of riparian habitat conservation area considered potential foraging habitat for these bat species.

### *Effects to Townsend's Big-Eared Bat, Pallid Bat, and Fringed Myotis*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed as part of the Magone Project would occur. In the short- to mid-term, the various habitats that currently exist within the project planning area would be maintained in the current condition and provide for the species diversity, density, and distribution that currently exists. Fire hazard and risk of insect outbreaks would remain elevated for some stands. Conversely, in the absence of disturbance in the long-term, open pine stands could continue to transition to multi-story stands. Closed roads currently being used would remain open, resulting in loss of security for some species and potential loss of snags from firewood cutting.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Of the 8,856 acres of potential late and old structure tree roost habitat in the project planning area, approximately 8 percent would be impacted by activities proposed under alternative 2; approximately 10 percent would be impacted by alternative 3; and approximately 5 percent under alternative 4. The following analysis focuses on the live tree component of bat habitat. A watershed analysis of snags can be found in the Management Indicator Species section under Dead and Defective Habitat.

All of the action alternatives would retain snags on the landscape wherever possible. However, alternatives 2 and 3 propose 48.8 and 92.4 miles of new trail, respectively. The construction and maintenance of these trails would likely increase the number snags identified as hazard trees that would subsequently be removed. This would contribute further snag loss and could reduce dead-tree roosting habitat for bats. In the short-term, project implementation could result in the potential further loss of large snags as a result of firewood cutting along roads temporarily opened for log haul or roads with unauthorized use.

Large green trees with dead tops provide habitat that receives solar radiation that warms the tree, and roosting bats often select sites that have higher temperatures. While roosting, especially during cooler weather, bats may go into a torpor, which is a state of reduced activity and metabolism as a result of lowered body temperatures (Tuttle 1997). Torpor and reduced body metabolism help the animal conserve energy during its daytime fast. A risk associated with this strategy includes the inability to respond quickly to threats. Depending on season and body temperature, a bat waking from torpor may not be able to fly for several minutes to an hour. If a roost tree with bats is felled, the animals may not be able to warm themselves and respond quickly enough to escape before the tree hits the ground and shatters.

Project design criteria would help retain snags within thinning units and during prescribed fire operations. Prescribed burning may also create habitat. Bats generally benefit from clusters of snags; areas where torching occurs during prescribed burning may result in tree mortality and snag creation beneficial for bat roost habitat. Further, in units where heavy machinery use would be required, some snag creation would be expected through "scuffing" and unintentional girdling of trees.

Alternatives 2, 3, and 4 would likely retain habitat in the short-term and increase habitat in the long-term, as all trees greater than and equal to 21 inches DBH (except grand fir) would be retained within late and old structure forest and across the landscape. Although broken top and hollow fir trees provide potential roost sites and the larger of these trees would be more valuable, very few grand fir trees of this size are currently present in the project planning area.

Retaining large trees of other species on the landscape may provide interim habitat important for roost habitat, while younger stands grow and develop into old forest. There is also suitable roosting habitat in the Nipple Butte Inventoried Roadless Area (IRA), in cracks and crevices of the many rock cliffs, and this habitat would not be altered or disturbed under any alternative.

Alternatives 2 and 3, and to a lesser extent alternative 4, would provide increased diversity in upland shrub habitats because of conifer/juniper removal prescriptions designed to enhance mountain mahogany and bitterbrush stands. This expected increase in plant diversity would result in an increase in prey diversity and abundance, and increase overall foraging habitat for bats, especially pallid bats and fringed myotis. Alternatives 2 and 3 propose 5,500 acres of upland shrub enhancement thinning, including areas in the Nipple Butte IRA as well as the Nipple Butte Wildlife Emphasis Area (WEA); alternative 4 proposes substantially less with all units outside the IRA and WEA.

Aspen stand enhancement treatments would increase the vigor, recruitment, and ultimately size of aspen stands in the project planning area. This would also create a more diverse prey base for bats, although benefits would be negligible as only 18 acres are proposed under all action alternatives.

Other recreation activities (i.e. accessible trail development, trailheads, interpretive signs, and boat and fishing docks) and the Magone Lake restoration activities (i.e., fish crib and fish stick placement) would not be expected to have any effect to bat species or habitat other than temporary disturbance and displacement during project activities.

Increased understory and plant vigor from thinning and prescribed fire in alternatives 2, 3, and 4 would also likely increase insect populations, and therefore provide higher quantities of insects and conceivably provide a more diverse prey base for bats in treated areas across the project planning area.

Alteration of roosting, maternity, and hibernacula habitat for bats (e.g., caves, adits, rock faces, buildings, and bridges) would not be expected through implementation of any action alternative.

All action alternatives would move younger stands toward old forest structure at some level, ultimately developing either large snags or large green trees with potential for dead tops, and would provide roost habitat benefiting these bat species in the long-term. Additionally, alternatives 2 and 3 propose approximately 5,550 acres of upland shrub enhancement treatments that would enhance or even create foraging habitat. Any of the action alternatives would benefit Townsend’s big-eared bat, pallid bat, and fringed myotis.

**Cumulative Effects to Townsend’s Big-Eared Bat, Pallid Bat, and Fringed Myotis**

The area considered for cumulative effects is the Magone project planning area and adjacent subwatersheds. All activities in Table 13 and Table 14 have been considered for their cumulative effects on Townsend’s big-eared bat, pallid bat, and fringed myotis.

Past timber harvest, thinning, road construction, fire suppression, wildfire, prescribed fire, and grazing have combined to create the existing condition within the Magone project planning area. Existing forest structure compared with the historical range of variability (HRV) reflects the effects of past management activities as well as large-scale disturbance events.

Past timber harvest targeted and removed many of the largest diameter trees reducing old forest structures (old forest multi strata and old forest single stratum) in the Warm Dry biophysical environment. Large green replacement trees removed during this time reduced future snag potential and subsequent large snag densities throughout the project planning area.

The Malheur Forest Plan, as amended, directs that timber sales be conducted to move stands towards old forest multi strata and old forest single stratum structural stages; maintain all live trees greater than or equal to 21 inches DBH; and maintain connectivity and reduce fragmentation of late and old structure (LOS) between LOS and dedicated old growth. Timber sales planned since that time within the project planning area have not contributed to loss of late and old growth forest, although understory stocking may have been reduced.

The County Road 18 Healthy Forest Restoration Act Project adjacent to and overlapping the eastern Magone project boundary is ongoing, and will ultimately thin commercially and non-commercially thin 1,200 and 1,600 acres, respectively. Prescribed burning is occurring along this corridor as well. The purpose of the County Road18 Project is to create a strategic fuel break along County Road 18, and is expected to result in very open, single strata pine stands with little to no component of snags or downed wood from high levels of mechanical treatment and repeated burning. This project could add cumulative effects to snag and LOS habitat suitable for bats.

Alternatives 2, 3, and 4 would likely retain hollow trees useful for roosting Townsend's big-eared bat, pallid bat, and fringed myotis as older, 21 inch trees and greater would not be removed. Moving stand structure towards HRV by restoring natural vegetation conditions and fire regimes would improve the sustainability of these habitats for associated wildlife species, and lower the risk of large scale insect infestation and higher severity wildfire. In the long-term, larger and older stand structure would provide snags valuable as roosting habitat.

Although prescribed fire proposed for the Magone Project could potentially consume a small number of smaller snags, it would also be expected to contribute small pulses of additional snag and potential roost habitat, benefiting Townsend's big-eared bat, pallid bat, and fringed myotis.

Public firewood cutting is expected to continue along open and closed roads with unauthorized use and contribute to loss of snags in the project planning area.

Projects within the Magone project planning area authorized under the Malheur National Forest Aquatic Restoration Environmental Assessment and Decision Notice (USDA Forest Service 2014b) would enhance or create riparian habitat, create or increase pools along riparian corridors, and enhance meadow habitat, resulting in beneficial impacts to bat species as these activities would be expected to increase insect diversity as well as create habitat more suitable for bat foraging.

Based on the proposed Malheur National Forest Access Travel Management Plan, it is foreseeable that cross country travel would be restricted for off road vehicle travel, with the exception of accessing dispersed camping sites from open roads. This would ultimately have a beneficial cumulative effect on snag retention, by reducing access for firewood cutting.

Overall, the combined effects of the Magone Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of Townsend's big-eared bat, pallid bat, and fringed myotis.

*Determination*

With their ability to use a broad range of habitats, it is expected that habitat for bats would be affected through implementation of any of the action alternatives. However, habitat alteration in the project planning area would not necessarily deem that habitat unsuitable; it would likely only change the way the habitat would be used by bats.

The proposed alternatives **may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species (MIIH)** because: there could be a degree of displacement or disturbance for bat species during project implementation; some live and dead trees providing habitat may be removed; enhancing foraging areas could benefit these species; and treatment could potentially change how affected habitat would be used by bat species.

### 3.9.3.3 Bufflehead

*Existing Condition for Bufflehead*

The bufflehead is a species of duck widely distributed throughout Oregon, although populations are relatively low. Bufflehead typically nest in cavities created by northern flickers or pileated woodpeckers near high mountain lakes surrounded by open woodlands, but will frequent open waters on major rivers and lakes outside of the breeding season (Gauthier 1996).

Although existing suitable habitat has not been formally surveyed for bufflehead, they have been documented at Magone Lake. Few mountain lakes or reservoirs provide appropriate nesting habitat on the Forest, and it is believed that appropriate breeding habitat for bufflehead is uncommon on the Blue Mountain Ranger District. However, Magone Lake is one of the most likely places on the District to be used by nesting bufflehead. Though buffleheads are documented at Magone Lake, nesting status has not been determined in the area.

Suitable post breeding habitat includes slow flowing, sheltered waters that ideally remain ice-free year round. With East Fork Beech Creek within the project planning area, some post-breeding areas for bufflehead may be present. Although there is no formal documentation recorded in Forest Service databases for buffleheads on or near the creek, occasional post-breeding presence is suspected in times of sufficient water flow.

*Effects to Bufflehead*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under this alternative, no management activities would occur and post-breeding habitat would remain unaltered. Buffleheads would continue to occur.

Increased recreation would not be expected as with the action alternatives. If buffleheads currently use Magone Lake for nesting, the level of nesting and nest success would be expected to remain unchanged.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Any direct and indirect impacts to buffleheads related to silviculture treatments and/or road activities would be expected to occur in or around post-breeding habitat. Effects from these activities would be expected to be short-term and most often associated with waterways where buffleheads utilize free-flowing waters, like East Fork Beech Creek, outside of the breeding season.

Although no direct habitat removal or alteration is planned in potential habitat types, project activities are expected to occur within close proximity to post-breeding areas. Increased traffic and activity levels along East Fork Beech Creek may temporarily displace loafing or feeding bufflehead in or around the project planning area. However, this disturbance would only be expected during implementation of treatments.

Recreation activities are proposed under all action alternatives. However, the miles of new trails and number of developments around Magone Lake are substantially higher in alternatives 2 and 3. Development of new biking and hiking trails would increase displacement and disturbance in areas where trails are constructed in potential post breeding habitat.

Improving trails, developing new day use areas, and modifying and constructing new docks around the lake as proposed in alternatives 2 and 3 would likely increase recreation in the area and ultimately decrease the likelihood of Magone Lake being utilized as nesting habitat for buffleheads. Further, an increase in the number of areas regularly used by recreationists would potentially increase the removal of snags identified as hazards. Removal of any snags containing or likely to contain cavities excavated by northern flickers or pileated woodpeckers would directly remove potential nesting areas for bufflehead.

Trees felled into or near Magone Lake for use as “fish sticks” under alternatives 2, 3, and 4 could also reduce the number of future snags and subsequent cavities suitable for nesting bufflehead, although trees selected for “fish sticks” would mostly be 8 to 12 inches DBH. By selecting smaller trees, the larger trees more valuable as future snags and potential nesting trees for buffleheads would be retained.

**Cumulative Effects to Bufflehead**

The area considered for cumulative effects is the Magone project planning area and adjacent subwatersheds. All of the activities in Table 13 and Table 14 were considered for their cumulative effects to bufflehead or their habitat.

Management activities and uses that have occurred in the past have not likely influenced the availability and quality of habitat for bufflehead because land management activities, recreation infrastructure development, and transportation corridors have not decreased the overall amount of suitable breeding and post-breeding habitat available. Intermittent disturbance and displacement from post-breeding habitat likely only resulted in individuals moving into adjacent areas with suitable post-breeding habitat such as Beech Creek (during times of adequate water flow) and the main stem John Day River.

At the local level, there may be impacts to individual buffleheads but population level effects are unlikely because: (1) buffleheads can easily travel longer distances, therefore, if temporarily displaced, they can easily move into other undisturbed habitat within or adjacent to the Magone project planning area; (2) any post-breeding habitat impacted would not be rendered unsuitable for bufflehead post-project; and (3) there is little suitable nesting habitat on the Blue Mountain Ranger District and nesting is not documented at Magone Lake or elsewhere within the project planning area. Therefore, any activities near Magone Lake would not be expected to routinely affect nesting buffleheads; thus population viability.

*Determination*

Due to the conclusion of effects discussed above, primarily displacement from post-breeding habitat and potential loss of suitable nesting cavities, the determination of effect of the action alternatives on the bufflehead is **may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species (MIIH).**

### 3.9.3.4 American Peregrine Falcon

*Existing Condition for Peregrine Falcon*

American peregrine falcon typically nest on cliffs and man-made structures greater than 75 feet high and are normally found no farther than 1 mile from water sources (Marshall et al. 2006). The presence of prominent cliffs is the most common habitat characteristic of peregrine falcon nesting territories (Hayes and Buchanan 2002, Hays and Milner 1999). A source of water, such as a river, lake, marsh, or marine waters, is typically in close proximity to nest sites and likely is associated with an adequate prey base of small to medium sized birds (Cade 1982, Johnsgard 1990).

No known peregrine falcon nest sites have been verified on the Malheur National Forest; however, potential natural nesting habitat may exist in the northern portion of the Nipple Butte Inventoried Roadless Area as well as areas adjacent to the project planning area at Ragged Rocks. However, peregrines have not been documented in the East Fork Beech Creek or Grub Creek subwatersheds.

*Effects to Peregrine Falcon*

**Alternatives 1, 2, 3, and 4 – Direct and Indirect Effects**

No documented nest sites or observations occur within the project planning area. Further, activities are not proposed near any potentially suitable nesting habitat under any alternative. Therefore, no direct or indirect effects would be expected.

**Cumulative Effects to American Peregrine Falcon**

Because no direct or indirect effects are anticipated as a result of the action alternatives, there would be no cumulative effects to American peregrine falcons.

*Determination*

The determination for American peregrine falcons is **no impact (NI)** for any of the alternatives because no activities are proposed in or adjacent to suitable nesting habitat under any alternative. Further, although potential nesting habitat exists in the project planning area, no nests or incidental observations have been documented.

### 3.9.3.5 Bald Eagle

*Existing Condition for Bald Eagle*

Bald eagle populations are managed under the Pacific States Bald Eagle Recovery Plan (USDI FWS 1986), the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the National Bald Eagle Management Guidelines (USDI FWS 2007).

Bald eagles generally nest near rivers, large lakes, or streams that support an adequate food supply, which generally consists of fish, waterfowl, and/or carrion. Potential nesting habitat is generally located within one mile of water (Marshall et al. 2006) and nest trees are normally mature or old-growth trees, with a large and open branch structure that can support the large nests. They shelter at winter roost sites, utilizing large trees with open branching patterns in the crown. The birds show a preference for the largest trees or snags in roosting areas (USDI FWS 1986).

Major threats to bald eagles continue to be environmental contaminants (especially lead shot or bullet fragments), excessive disturbance by humans, and illegal shooting (NatureServe 2010).

Incidental sightings of bald eagles are documented within the project planning area. However, no known roosts or nests are documented at this time.

### *Effects to Bald Eagle*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, there would be no management activities. Existing cover and stand densities would remain the same. Within the dry forest types, stocking levels for some stands would remain elevated. Potential losses from insects, disease, or wildfire would remain elevated for some stands. Wildfire events or outbreaks of insects and disease could affect large overstory trees used by bald eagles for roost or nest habitat; however, location, extent, and severity would determine the level of disturbance. Current open road access would remain the same, with potential loss of large snags along these roads as firewood is removed.

This alternative could lead to the decrease of the health and vigor of large diameter ponderosa pine used for nesting and roosting. Trends in risk of loss to insect, disease, and wildfire would not be altered. This action may result in loss of large ponderosa pine and reduce or eliminate the use of the area for nesting.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

No known bald eagle nests exist in the project planning area. If nests are discovered before or during any stage of project implementation, buffers and timing restrictions would be incorporated into the project design criteria, as per National Bald Eagle Management Guidelines (USDI FWS 2007), which would aid in mitigating possible project impacts. Further, if additional impacts were to be determined, further mitigations and restrictions would apply.

Bald eagles have been documented in the project planning area outside of breeding season, likely utilizing East Fork Beech Creek and possibly Magone Lake for general travel and/or foraging. If bald eagles were encountered during implementation of proposed activities, displacement and avoidance would be expected in areas of activity or increased traffic from roads or trails.

The action alternatives were developed to meet the purpose and need of the Magone Project. The purpose and need includes the desire to retain and develop future old trees. Retention of existing large trees, and accelerating tree growth to move younger stands towards older forest structure with large trees, would benefit bald eagles in the long-term by providing larger, older tree structure and additional potential roost trees. In the short-term, project implementation could result in the potential loss of large snags if designated as hazard trees (e.g., within units or along haul routes), or lost as a result of firewood cutting along roads temporarily opened for log haul or roads with unauthorized use.

A watershed-scale snag analysis has been done for the watershed and is summarized in the Management Indicator Species section under Dead and Defective Habitat.

Prescribed fire activity could result in the loss of large green trees or snags; design criteria that include ignition patterns avoiding snags, and clearing brush and fuel accumulations from select snags would minimize losses. Overall reduction in fire risk as a result of thinning and fuels reduction would benefit retention of large old ponderosa pine and snags, benefiting bald eagle nest and roost habitat in the long-term.

Alternative 2 proposes 1.1 miles of road closures and 0.3 miles of road decommissioning within potential bald eagle habitat. Alternatives 3 and 4 propose 0.3 miles of road closure and the same amount of road decommissioning as alternative 2. Road closure activities likely would result in retaining more snags as a result of less public firewood cutting. However, an increase in biking and hiking trails could reduce snag numbers through danger tree removal along newly developed trails. Snag retention may increase winter roost sites or perch trees, although there would likely be no effect to nesting bald eagles as Isaacs and Anthony report that 98.9 percent of eagle nests are built in live trees (Marshall et al. 2006).

Prey species would not be negatively affected. In the long-term, activities that improve riparian conditions such as shade or riparian hardwood diversity and vigor, or activities to enhance fish habitat in Magone Lake would result in beneficial effects for fish species, prey for bald eagles.

**Cumulative Effects to Bald Eagle**

The area considered for cumulative effects is the Magone project planning area. All of the activities listed in Table 13 and Table 14 were considered for their cumulative effects to bald eagles and their habitat.

Past timber harvest, thinning, road construction, fire suppression, wildfire, prescribed fire, and grazing have combined to create the existing condition within the project planning area. Existing forest structure compared with the historical range of variability (HRV) reflects the effects of past management activities as well as large-scale disturbance events.

Past timber harvest targeted and removed many of the most valuable, largest diameter ponderosa pine, reducing potential roosting and nesting habitat. However, the Malheur Forest Plan, as amended in 1995, directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards old forest multi strata and old forest single stratum structural stages, and timber sales planned since that time would not have contributed to loss of mature and old growth forest.

The County Road 18 Healthy Forest Restoration Act Project adjacent to and overlapping the eastern Magone project boundary is ongoing, and will ultimately commercially and non-commercially thin 1,200 and 1,600 acres, respectively. Proposed commercial harvest adjacent to the Magone project planning area includes the Camp Lick Project (currently being analyzed). Cumulatively, the effects of the County Road 18 and Camp Lick projects would likely benefit bald eagles, as both projects would retain and develop future old trees.

Public firewood cutting is expected to continue along open roads. Based on the proposed Malheur National Forest Access Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off-road vehicle travel, with the exception of accessing dispersed campsites from open roads.

Proposed road decommissioning and closure activities for the Magone Project, combined with the foreseeable changes in travel management, would have a beneficial cumulative effect on snag retention by reducing access for firewood cutting, thus increasing potential winter roost and eagle perch sites.

The implementation of alternatives 2, 3, and 4 would provide positive effects and may diminish some past negative cumulative impacts to large tree structure within the cumulative effects boundary.

#### *Determination*

The determination for bald eagle is **may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species (MIIH)**. In the long-term, treatments would help retain and promote growth and longevity of large trees and would have a **beneficial impact (BI)** on bald eagles.

### 3.9.3.6 Lewis's Woodpecker

#### *Existing Condition for Lewis's Woodpecker*

Lewis's woodpecker inhabits primarily open forests and woodlands, with breeding habitat typically characterized by open canopy and brushy understory, with perch sites and abundant insects (Abele et al. 2004). This species is strongly associated with post-fire habitats, particularly high burn severity areas with clumps of decaying large diameter snags.

This species is considered a weak excavator and seldom excavates its own nest cavity; instead it relies on cavities created by other woodpeckers (Bock 1970). Nesting habitat consists of two distinct types in eastern Oregon: riparian areas with large cottonwoods, and fire maintained or burned old-growth ponderosa pine forests (NatureServe 2014). Burned ponderosa pine stands appear to represent the highest quality breeding habitat for Lewis's woodpeckers, based on reproductive success and nest-site selection (Saab and Vierling 2001). Presence of Lewis's woodpecker is also connected with unburned ponderosa pine forests with open canopies and large trees; however, it is generally at lower abundance in these habitats than in post-fire habitat. For purposes of analysis, primary source habitat is defined as post-fire habitat and secondary source habitat is defined as old forest single stratum forest and riparian areas with large tree structure.

In 2014, the Region 6 wildlife ecologist classified (modelled) habitat for late-seral associated management indicator species (MIS) on the Malheur National Forest using vegetation type, size class, canopy closure, and canopy layer data provided in the Forest-wide vegetation data layer as of May 5, 2014. This provided Malheur National Forest wildlife biologists with acres and distribution of primary and secondary habitat for these late-seral associated species across the Forest. This data was corrected by Blue Mountain District wildlife staff to eliminate "slivers," or miniscule polygons with no data. The data was also corrected to an accurate Malheur National Forest boundary.

Primary habitat for Lewis's woodpecker was not included in this effort as primary habitat is defined as post-fire habitat. There are 24,689 acres of secondary habitat for Lewis's woodpecker on the Malheur National Forest. Approximately 796 acres, or about 3.5 percent, of those acres are within the Magone project planning area.

There are 4,200 acres of riparian habitat conservation area (RHCA) within the project planning area; however, most acres lack the cottonwood component desirable for Lewis's woodpecker. Further, no recent large fires have occurred within the Magone project planning area and therefore no primary source habitat for Lewis's woodpecker is present. Therefore, Lewis's woodpeckers would be expected to have minimal suitable breeding habitat within the project planning area.

Analysis of habitat is a broad scale look at the live tree component and does not provide information on stand specific snag or down wood levels. A watershed-scale snag analysis has been done for the Beech Creek and Grub Creek watersheds and is summarized in the Management Indicator Species section under Dead and Defective Habitat.

Lewis's woodpeckers are not documented within the Magone project planning area; however, they are expected to occur in low densities in the 796 acres of secondary habitat present in the planning area.

### *Effects to Lewis's Woodpecker*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Habitat for Lewis's woodpecker would not be treated and current trends in habitat condition would continue. Habitat would remain below the HRV, and Lewis's woodpecker habitat would be expected to decline with the ingrowth of understory trees and subsequently a reduction in the amount of open habitats. Trends in risk of habitat loss to insect, disease, and wildfire would not be altered. Refer the Silviculture and Fire, Fuels, and Air Quality reports for detailed discussion of risk of loss to these disturbance agents. This alternative could ultimately lead to an elevated risk of high-intensity wildfire, which could provide an increase in habitat for the Lewis's woodpecker.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

The purpose and need of the Magone Project identifies restoring ecological structure and function of forest ecosystems within the project planning area to improve forest health and increase resilience to drought, fire, insects, diseases, and other disturbances. Therefore, action alternatives would not promote primary source habitat for Lewis's woodpecker as compared to the no action alternative.

Action alternatives would utilize commercial thinning , non-commercial thinning, and prescribed fire to reduce the understory fir component on acres dominated by ponderosa pine and western larch. Prescriptions are designed to increase the abundance of more open stand structure with ponderosa pine contributing a relatively larger percentage of the species composition. This would help restore Lewis's woodpecker habitat and bring levels closer to the historical range of variability (HRV). Implementation of alternative 2 would result in a 10 percent increase of secondary habitat, while implementation of alternatives 3 and 4 would result in a 13 percent increase and a 6 percent increase of secondary habitat, respectively. However, alternatives 2 and 4 would remain below HRV estimates by Powell (1998).

Affects to snags are likely to result from prescribed fire, temporary opening of closed roads for log haul, construction of temporary roads, and hazard tree removal. Prescribed fire has the potential to modify the size, abundance, and condition class of snags in treated areas, which could yield both positive and negative results to habitat for this species. A watershed-scale analysis of snags done for the Magone Project can be found in the Management Indicator Species section under Dead and Defective Habitat.

The extent of project activities and expected outcomes should provide for a net increase of secondary habitat acres for each action alternative (Table 101). The amount of secondary habitat would be increased by all action alternatives. In the short-term habitat would remain below the HRV in alternatives 2 and 4; however, modeling predicts that by 2055 habitat would be within the HRV as identified by Powell (1998).

**Table 101. Warm Dry forest structural stages, displaying old forest single stratum by alternative and historical range of variability (HRV), based on modeling for year 2025 and 2055**

| Year | Description | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 | HRV |
|---|---|---|---|---|---|---|
| 2025 | Old forest single-stratum | 3% | 13% | 16% | 9% | 15-55% |
| 2055 | Old forest single-stratum | 15% | 30% | 37% | 23% | 15-55% |

Source: Compiled from Magone Silviculture Report.

During project operations, a degree of disturbance and displacement of Lewis's woodpeckers would be possible.

### Cumulative Effects to Lewis's Woodpecker

The area considered for cumulative effects is the Magone project planning area and adjacent subwatersheds to include other proposed projects. All of the activities in Table 13 and Table 14 have been considered for their cumulative effects on Lewis's woodpecker.

Past timber harvest, thinning, road construction, fire suppression, wildfires, prescribed fire, and grazing have combined to create the existing condition within the Magone project planning area. Existing forest structure compared with the historical range of variability (HRV) reflects the effects of past management activities as well as large-scale disturbance events.

Past timber harvest targeted and removed many of the most valuable, largest diameter ponderosa pine, reducing potential roosting and nesting habitat. However, the Malheur Forest Plan, as amended in 1995, directs the Malheur National Forest to conduct timber sales in a manner that moves stands towards old forest multi strata and old forest single stratum structural stages. Timber sales planned since that time would not have contributed to loss of mature and old growth forest. Proposed commercial harvest within and adjacent to the project planning area that may continue includes the 18 Road Fuels Reduction Project and the adjacent Camp Lick Project. Both projects propose to reduce hazardous fuels and would retain and develop future old trees. The 18 Road Project includes commercially thinning 1,200 acres, non-commercially thinning 1,600 acres, and applying prescribed fire throughout the corridor. The result is generally open pine stands suitable for Lewis's woodpeckers. Cumulatively, the effects of the 18 Road and Camp Lick projects would likely increase secondary source habitat but inhibit the development of primary source habitat.

Current livestock grazing in the uplands and along streams is affecting nesting and foraging habitat for Lewis's woodpecker. Cattle may shift plant species composition and abundance through selection of more palatable forage species. Cattle reduce ground cover through trampling or consuming vegetation, decreasing insect availability. Past grazing in stream corridors has also reduced riparian shrub habitat.

The conditions of some riparian areas and aspen habitats has been improved by new management practices and restoration activities in more recent years, but some areas are still not fully restored to conditions that are most suitable for Lewis's woodpecker. Expanding and enhancing riparian habitats would benefit the Lewis's woodpecker.

The road network in the analysis area (largely a result of past harvest) has impacted snag densities by decreasing habitat from road construction and increasing accessibility of the area to firewood cutting. Public firewood cutting is expected to continue along open roads. Based on the proposed Malheur National Forest Access Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off-road vehicle travel, with the exception of accessing dispersed camping sites from open roads. The proposed road decommissioning and closure activities for the Magone Project, though negligible, combined with the foreseeable changes in travel management would have a beneficial cumulative effect on snag retention by reducing access for firewood cutting, thus increasing potential nesting and foraging habitat for Lewis's woodpecker.

Within the cumulative effects boundary, invasive weed treatments, as authorized by the Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015b), would be beneficial to the persistence of native vegetation but would have little to no impacts to the Lewis's woodpecker or its habitat. Cumulative effects when combined with invasive weed treatments would be negligible.

#### *Determination*

The determination of effect of the action alternatives on the Lewis's woodpecker is **may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species (MIIH).** In the long-term, treatments would help retain and promote growth and longevity of large trees and would have a **beneficial impact (BI)** on Lewis's woodpecker.

### 3.9.3.7 White-Headed Woodpecker

#### *Existing Condition for White-Headed Woodpecker*

The white-headed woodpecker occurs mainly in open ponderosa pine or mixed conifer forests dominated by ponderosa pine (Marshall et al. 2006). Landscapes with a mosaic of open habitat for nesting in close proximity to closed-canopy forests that provide foraging habitat seem to be important for white-headed woodpeckers (Mellen-McLean et al. 2013). This species relies on seeds from ponderosa pine cones and insects gleaned off ponderosa pine and mixed conifer trees for its foraging needs.

Large ponderosa pine snags, mean diameters ranging from 25 to 31 inches, are utilized for nesting (Frenzel 2004). Nest cavities are relatively low to the ground, and can fail as a result of predation from small mammals.

Throughout the range, habitat components include an abundance of mature pines (with large cones and abundant seed production), with relatively open canopy cover within preferred habitat (Garrett et al. 1996).

Habitat degradation and loss of large diameter ponderosa pine stands continue to be the greatest threats to white-headed woodpeckers. Habitat for white-headed woodpeckers in Oregon and Washington is probably less than 10 percent of what existed prior to European-American settlement (Henjum 1994). Historically, white-headed woodpeckers were well distributed throughout the Blue Mountains.

A conservation assessment for the white-headed woodpecker (Mellen-McLean et al. 2013) includes the following management considerations for restoration of habitat used by white-headed woodpeckers:

- Retaining and producing large, older ponderosa pine used for foraging
- Retaining and producing large snags used for nesting
- Reducing shrub cover and excess down wood to reduce numbers of small mammals that prey on nests
- Reducing canopy density to provide interspersion of open and closed pine stands
- Maintaining within stand heterogeneity

There are approximately 350,096 acres of white-headed woodpecker habitat across the Malheur National Forest, modeled as primary (180,978 acres) and secondary (169,118 acres) habitat. However, within the project planning area there are 605 acres of primary and 2,154 acres of secondary habitat; less than 1 percent of the overall habitat on the Forest.

Analysis of habitat is a broad scale look at the live tree component and does not provide information on stand specific snag or down wood log levels. A watershed-scale snag analysis has been done for the Beech Creek and Grub Creek watersheds and is summarized in the Management Indicator Species section under Dead and Defective Habitat.

White-headed woodpeckers have been documented throughout its habitat in the project planning area.

### *Effects to White-Headed Woodpecker*

**Alternative 1 (No Action) – Direct and Indirect Effects**

The no action alternative would remain below the HRV for white-headed woodpecker and its associates in the short-term. This alternative would maintain the existing acres of fir-dominated understories and the trend toward fir dominated habitats. In the long-term, there would be a continued decline in habitat for white-headed woodpecker, which prefers open pine-dominated stands. Mortality of large ponderosa pine due to stand densities being above sustainable levels would likely result in loss of foraging habitat for white-headed woodpeckers (live pine) as the overstory pine trees succumb to stress from competition in overstocked stands. Open road density would remain the same, thus fuelwood cutting (snag removal) is not likely to change.

Over time, stand conditions are expected to decline on sites that cannot sustain high densities of conifers. As trees on such sites succumb to insect invasion they would stop producing seeds, sap, and invertebrates associated with foliage. These are listed as important food resources for this species (Marshall et al. 2006). If tree mortality becomes extensive and live canopy closure is lost in large areas of severe insect infestations or fire intensity, affected areas would become less suitable for this species. If the mortality remains moderate and patchy, the affected areas may become more suitable for this species, which prefers relatively open forest conditions.

Under alternative 1, habitat for the white-headed woodpecker would not be treated and current trends in habitat condition would continue. Habitat for the white-headed woodpecker would remain below the HRV. Trends in risk of habitat loss to insects, diseases, and wildfire would not be altered.

This alternative would have no direct effects on the white-headed woodpecker. Indirectly, it could ultimately lead to an elevated level of risk of habitat loss in some areas. Lack of treatment in ponderosa pine habitats to reduce stand density and create single stratum habitats would maintain the current projection of reduced habitat suitability for the white-headed woodpecker.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

The purpose and need of the Magone Project identifies transitioning the drier forest landscapes to more historically present fire resistant tree species, retaining and developing future old trees. Therefore, the action alternatives would likely promote high quality habitat for white-headed woodpecker as compared to the no action alternative.

Action alternatives would utilize commercial thinning, non-commercial thinning, and prescribed fire to reduce the understory fir component on acres dominated by ponderosa pine and western larch. Prescriptions are designed to increase the abundance of more open stand structure with ponderosa pine contributing a relatively larger percentage of the species composition. This would help restore white-headed woodpecker habitat and bring levels closer to HRV. Implementation of alternative 2 would result in a 10 percent increase of source habitat, while implementation of alternatives 3 and 4 would result in a 13 and 9 percent increase of source habitat, respectively. However, alternatives 2 and 4 would remain below HRV estimates by Powell (1998).

Affects to snags are likely to result from prescribed fire, temporarily opening closed roads for log haul, construction of temporary roads, and danger tree removal. Prescribed fire has the potential to modify the size, abundance, and condition class of snags in treated areas, which could yield both positive and negative results to habitat for this species. A watershed-scale analysis of snags done for the Magone Project can be found in the Management Indicator Species section under Dead and Defective Habitat.

Malheur Forest Plan standards for green tree replacements would be met during commercial thinning activities. These replacement trees would be available to meet future snag needs in all harvest units. Forest plan standards for retention of snags within activity units would also be met (see Appendix C – Project Design Criteria).

In the short-term, habitat would remain below the HRV; however, modeling predicts that by 2055 habitat would be within the HRV for white-headed woodpecker as identified by Powell (1998).

**Cumulative Effects to White-Headed Woodpecker**

The area considered for cumulative effects is the Magone project planning area. All of the activities in Table 13 and Table 14 have been considered for their cumulative effects on white-headed woodpecker.

Past timber harvest, thinning, road construction, fire suppression, wildfire, prescribed fire, and grazing have combined to create the existing condition within the Magone project planning area. Existing forest structure compared with the historical range of variability (HRV) reflects the effects of past management activities as well as large-scale disturbance events.

Past timber harvest targeted and removed many of the most valuable, largest diameter ponderosa pine, reducing potential roosting and nesting habitat. However, since 1995, the Malheur Forest Plan as amended has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards old forest multi strata and old forest single stratum structural stages, and timber sales planned since that time would not have contributed to loss of mature and old growth forest. Proposed commercial harvest within and adjacent to the project planning area that may continue includes the 18 Road and Camp Lick projects. Both projects propose to reduce hazardous fuels and would retain and develop future old trees. The 18 Road Project includes commercially thinning 1,200 acres, non-commercially thinning 1,600 acres, and applying prescribed fire throughout the corridor. The result is generally the open pine stands preferred by white-headed woodpeckers. Cumulatively, the effects of the 18 Road and Camp Lick projects would likely increase high quality habitat.

Current livestock grazing in the uplands and along streams may have caused shifts in plant species composition and abundance through selection of more palatable forage species; however, grazing does not alter snag densities or the number of mature pine so there are no anticipated effects as a result of implementation of any of the action alternatives. Therefore, there would be no cumulative effects on white-headed woodpecker as a result of livestock grazing.

The road network in the analysis area (largely a result of past harvest) has impacted snag densities by decreasing habitat from road construction and increasing accessibility of the area to firewood cutting. Public firewood cutting is expected to continue along open roads. Based on the proposed Malheur National Forest Access and Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off-road vehicle travel, with the exception of accessing dispersed campsites from open roads. The proposed road decommissioning and closure activities for the Magone Project though negligible, combined with the foreseeable changes in travel management would have a beneficial cumulative effect on snag retention, by reducing access for firewood cutting, thus increasing potential nesting and foraging habitat for white-headed woodpeckers.

Within the cumulative effects boundary, invasive weed treatments, as authorized by the Malheur National Forest Site-Specific Invasive Plant Treatment Record of Decision (USDA Forest Service 2015a), would be beneficial to the persistence of native vegetation but would have little to no impacts to the white-headed woodpecker or its habitat. Cumulative effects when combined with invasive weed treatments would be negligible.

### *Determination*

The determination of effect of the action alternatives on the white-headed woodpecker is **may impact individuals or habitat, but will not likely result in a trend toward federal listing or loss of viability to the population or species (MIIH).** In the long-term, treatments would help retain and promote growth and longevity of large trees and increase in old forest single stratum, which would have a **beneficial impact (BI)** on white-headed woodpecker.

### 3.9.3.8 Johnson's Hairstreak

#### *Existing Condition for Johnson's Hairstreak*

Johnson's hairstreak butterfly range from southwestern British Columbia, south through Washington, Oregon, and western Idaho to central California. Scattered sightings in Oregon occur in the Coast Range, Siskiyou Mountains, Blue Mountains, and Wallowas.

These butterflies spend the majority of their time in the top of the forest canopy, so are infrequently seen. Adults feed on nectar of flowers from numerous genera including Actostophylos, Ceanothus, Cornus, Fragaria, Rorrippa, and Spraguea. In the northern parts of the range, or at higher altitudes, adults fly from late May through mid-July. At lower elevations, adults fly from mid-May to early September, with peaks occurring in May and August (Pyle 2002). In northeastern Oregon, Johnson's hairstreak larvae have been documented feeding on western dwarf mistletoe (*Arceuthobium campylopodum*) on ponderosa pine. Other dwarf mistletoes occurring in the Blue Mountains include dwarf mistletoes on lodgepole pine, western larch, and Douglas-fir. While these other dwarf mistletoes are possible hosts, use of these species by Johnson's hairstreak larvae have not been confirmed (Spiegel 2014). Dwarf mistletoe does not occur on grand or white fir in the Blue Mountains (Spiegel 2014).

Hessburg et al. (1999) investigated changes from historical to current insect and disease vulnerabilities of selected subbasins within the Columbia River Basin, including subbasins in the Blue Mountains Ecological Reporting Unit, which covers the area reported to host Johnson's hairstreak (Spiegel 2014). The Hessburg et al. (1999) analysis reveals the slow decline of dwarf mistletoe-infected ponderosa pine through the loss of much of the pine overstory and the encroachment of shade-tolerant species into once pine-dominated stands (Spiegel 2014). Additionally the analysis determined that the maintenance of healthy populations of Johnson's hairstreak requires the maintenance of ponderosa pine and possibly western larch (Spiegel 2014).

No documented occurrences of Johnson's hairstreak have been recorded within the project planning area; however, suitable habitat does exist. Dwarf mistletoe supporting caterpillar larvae could occur on ponderosa pine forested stands within the project planning area. The ponderosa pine plant associations (as well as Douglas-fir plant associations, and drier grand fir plant associations where ponderosa pine is often common along with the fir) were used to determine potential habitat for Johnson's hairstreak. Approximately 16,000 acres of potential habitat is found within the project planning area. Nectar plants used by adult butterflies are generally widespread and common within the project planning area.

#### *Effects to Johnson's Hairstreak*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed for the Magone Project would occur. In the short- to mid-term, the various habitats that currently exist within the project planning area would be maintained in the current condition, and provide for the species diversity, density, and distribution that currently exists. Over the long-term, increased stand densities and related stress would result in a greater incidence of insects and disease in the project planning area. Dwarf mistletoe, one of the diseases that increases with increasing stand densities, would increase where present within the project planning area. In the event of a wildfire, however, uncharacteristically intense burns could effectively sanitize stands of dwarf mistletoe. When all trees are killed, reestablishment of dwarf mistletoe in stands could take decades, as seeds are reintroduced by birds and the mistletoe slowly spreads (Spiegel 2014).

### Alternatives 2, 3, and 4 – Direct and Indirect Effects

Action alternatives were developed to meet the purpose and need of the Magone Project, which includes: transitioning the drier forest landscapes to more historically present fire resistant tree species (ponderosa pine and western larch); and restoring the ecological structure and function of forest ecosystems within the project planning area to improve forest health and increase resilience to drought, fire, insects, diseases, and other disturbances. Additionally, Malheur Forest Plan standards include: 1) avoid the creation of vegetation conditions which could promote insect and disease infestations (USDA Forest Service 1990a, Forest-wide Standard 187, page IV-45); and, 2) apply integrated pest management principles to minimize the impacts of the mountain pine beetle, western spruce budworm, tussock moth, and other insect and disease infestations to the extent necessary to achieve the overall goals and objectives (USDA Forest Service 1990a, Forest-Wide Standard 186, page IV-45).

All action alternatives propose using commercial thinning, non-commercial thinning, and prescribed fire to reduce appropriate stand densities to achieve the overall goals and objectives of the Malheur Forest Plan and meet the purpose and need of the Magone Project.

Maintaining, reestablishing, or enhancing ponderosa pine in areas where it was historically dominant would benefit Johnson's hairstreak in the long-term. In ponderosa pine, and drier Douglas-fir and grand fir plant associations, commercial and non-commercial thinning would result in more open stands favoring ponderosa pine. Trees targeted for removal on drier, more southerly exposure sites would generally be grand fir. Consequently, host ponderosa pine and western dwarf mistletoe are anticipated to be retained on the landscape.

For all alternatives, harvest of some mistletoe-infected trees potentially providing habitat for Johnson's hairstreak would occur. This would result in a direct reduction of potential habitat, and may impact Johnson's hairstreak individuals, but would not impact the ability of the species to survive in the Blue Mountains (Spiegel 2014). Many larger, older trees (over 150 years old) would be retained. Skips within units and no treatment units would also retain ponderosa pine trees that could potentially host dwarf mistletoe. Further, project design criteria would leave an adequate number of "wolfy" mistletoe infested trees for wildlife habitat; primarily for blue grouse and Johnson's hairstreak.

Because larvae feed on all exposed plant parts of dwarf mistletoe and can be found on host leaves April through October, prescribed burning may impact Johnson's hairstreak in the short-term. Heat and smoke from underburning operations may affect larvae, depending on the intensity of the burn and if wind moves smoke and heat out of the canopy. The butterflies themselves would be mobile and able to shift from an area being underburned. Not all areas within the project planning area would be burned at any given time. Burn blocks would not be contiguous, providing unburned refugia where butterflies and caterpillar larvae would be expected to persist. While short-term impacts could occur, prescribed burning that reduces fuels, and future fire intensity, would maintain ponderosa pine on the landscape and benefit potential Johnson's hairstreak habitat in the long-term.

### Cumulative Effects to Johnson's Hairstreak

The area considered for cumulative effects is the Magone project planning area. All of the activities in Table 13 and Table 14 have been considered for their cumulative effects on Johnson's hairstreak butterfly.

Past timber harvest, thinning, road construction, fire suppression, wildfire, prescribed fire, and grazing have combined to create the existing condition within the Magone project planning area. Existing forest structure compared with the historical range of variability (HRV) reflects the effects of past management activities as well as large-scale disturbance events.

Present and foreseeable future projects within the cumulative effects boundary that would affect the Johnson's hairstreak include the 18 Road and Camp Lick projects. The 18 Road and Camp Lick projects propose to reduce hazardous fuels and would retain and develop future old trees. The 18 Road Project includes commercially thinning 1,200 acres, non-commercially thinning 1,600 acres, and applying prescribed fire throughout the corridor. The result is generally open pine stands suitable for Johnson's hairstreak, although some mistletoe could be reduced. Therefore, there would be no cumulative effects on the Johnson's hairstreak butterfly as a result of implementing the 18 Road and Camp Lick projects. Conversely, these projects combined with the Magone Project should cumulatively benefit the Johnson's hairstreak by decreasing the risk of loss of habitat from wildfire.

#### *Determination*

The proposed alternatives **may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species (MIIH)** in the short-term because the harvest of mistletoe-infected trees would occur and heat and smoke from underburning could affect larvae and adult individuals. In the long-term, alternatives 2 and 3 and, to a lesser extent, alternative 4 would maintain healthy levels of large ponderosa pine and mistletoe and therefore have a **beneficial impact (BI)** on the Johnson's hairstreak.

### 3.9.3.9 Silver-Bordered Fritillary

#### *Existing Condition for Silver-Bordered Fritillary*

Habitat for this butterfly species consists of open wet meadows, bogs, and marshes. Caterpillar host plants consist of violets, including pioneer violet (*Viola glabella*) and northern bog violet (*V. nephrophylla*). Adult nectar plants are composite flowers including goldenrod (*Solidago* spp.) and black-eyed Susan (*Rudbeckia* spp.). Emergence and flight of adults begins in June through July, with a second generation flight occurring late summer and fall during August through September (Miller and Hammond 2007).

The silver-bordered fritillary is dependent upon the maintenance of wet meadow habitat and its associated food plants. Downcutting of creeks and subsequent draining and drying out of meadow habitat, loss of native plant species due to overgrazing or trampling by domestic cattle, and invasion of non-native grasses and other weedy species remain the dominant threats to habitat.

Two primary colonies occur in Oregon; one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains on the Malheur National Forest (Miller and Hammond 2007). Other potential habitat on the Forest exists as moist and wet meadows consisting of approximately 19,500 acres. Within the project planning area 60 acres of riparian/moist meadows is present (less than 1 percent of the project planning area). Although, no silver-bordered fritillaries have been documented within the project planning area, no formal surveys for the butterfly were conducted.

### *Effects to Silver-Bordered Fritillary*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed for the Magone Project would occur. In the short- to mid-term, the various habitats that currently exist within the project planning area would be maintained in the current condition, and provide for the species diversity, density, and distribution that currently exists. Meadow habitat potentially used by silver-bordered fritillary would not change; effects would be primarily from ongoing cattle grazing. Open road densities would remain about the same, potentially resulting in invasive weed establishment from seeds brought in by vehicles. Drying of moist to wet meadows may result in conifer succession and loss of habitat in the long-term. Alternative 1would not alter habitat for this species. In the short-term, meadow habitats would remain in their current state. However, in the long-term, drying of moist wet meadows may result in loss of habitat.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

The effects of alternatives 2, 3, and 4 for silver-bordered fritillary are similar and expected to be limited. No commercial or non-commercial thinning activities are scheduled for moist or wet meadow habitat. Burn blocks may encompass moist to wet meadow habitat for all alternatives, through inclusions associated with timbered stands. No direct lighting of meadow habitat is scheduled.

Open roads have the potential to introduce invasive weeds to meadow habitat, degrading native plant communities. Road closures after project implementation and project design criteria to reduce the spread of invasive weed species would offset effects. Meadow areas are protected from vehicle traffic and road construction (see Appendix C – Project Design Criteria).

While no direct lighting of meadow habitat is anticipated during prescribed burning operations, some backing fire could occur in meadow habitat. Spring burns would have limited potential for burning in wet meadows. Fall burns would generally occur late enough in the season to avoid affecting nectar plants important to adult butterflies. Riparian restoration that would influence adjacent meadow habitat would likely benefit silver-bordered fritillary.

Proposed recreation trails would avoid moist to wet meadows and therefore not have any effects to silver-bordered fritillary.

**Cumulative Effects to Silver-Bordered Fritillary**

The area considered for cumulative effects is the Magone project planning area. All of the activities listed in Table 13 and Table 14 were considered for their cumulative effects on silver-bordered fritillary or their habitat.

Unregulated livestock grazing earlier in the century may have affected grass, forb, and sedge composition within meadow habitat in the project planning area. Introduction of non-native grasses and invasive weedy species may have also affected meadow habitat. Over time, and with changes in grazing management, habitat has improved. Cattle grazing is ongoing within the project planning area. It is expected that the current use levels would continue to contribute to an upward trend in riparian and associated moist to wet meadow habitat.

Invasive weed species that affect native vegetation may be spread by vehicles. Project design criteria requiring cleaning of equipment would limit potential additive weed establishment within units or along haul routes. Based on the proposed Malheur National Forest Access and Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off-road vehicle travel, with the exception of accessing dispersed camping sites from open roads. Proposed road decommissioning and closure activities for the Magone Project, though negligible, combined with the foreseeable changes in travel management would have a beneficial cumulative effect in the reduction of potential weed establishment in native plant communities important as silver-bordered fritillary habitat.

Overall, the combined effects of the Magone Project with the effects of past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations of silver-bordered fritillary.

*Determination*

The determination for silver-bordered fritillary and its habitat would be **no impact (NI)**. The silver-bordered fritillary is not known to occur within the project planning area although habitat is present. The action alternatives would have negligible effects to moist and wet meadow habitat because of project design criteria.

### 3.9.3.10 Summary of Effects Determinations for Threatened, Endangered, and Sensitive Species

Table 102 summarizes the effects determinations for threatened, endangered, and sensitive species as they relate to proposed activities.

**Table 102. Effects to proposed, endangered, threatened, and sensitive species**

| Common name | Alternative 1 (no action) | Alternative 2 | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Gray wolf (E of Hwy 395) | NI | NI | NI | NI |
| Pallid Bat | NI | MIIH | MIIH | MIIH |
| Townsend's big-eared bat | NI | MIIH | MIIH | MIIH |
| Fringed myotis | NI | MIIH | MIIH | MIIH |
| Bufflehead | NI | MIIH | MIIH | MIIH |
| American peregrine falcon | NI | NI | NI | NI |
| Bald eagle | NI | MIIH/BI | MIIH/BI | MIIH/BI |
| Lewis's woodpecker | NI | MIIH/BI | MIIH/BI | MIIH/BI |
| White-headed woodpecker | NI | MIIH/BI | MIIH/BI | MIIH/BI |
| Johnson's Hairstreak | NI | MIIH/BI | MIIH/BI | MIIH/BI |
| Silver-bordered fritillary | NI | NI | NI | NI |

NI = No Impact.

MIIH = May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species.

WIFV = Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species.

BI = Beneficial Impact.

### 3.9.4 Management Indicator Species

The National Forest Management Act (NFMA) directs the Forest Service to provide habitat to maintain viable populations of existing native and desired non-native vertebrate species. Management indicator species (MIS) were selected for emphasis in planning, and MIS are assessed during forest plan implementation in order to determine the effects of management activities on their populations and the populations of other species with similar habitat needs. The amount and quality of habitat is used as a proxy for determining the effects of projects on MIS.

The Malheur Forest Plan provides direction for managing habitat quality for MIS by management area. Forest-wide Standard 61 of the Forest Plan (USDA Forest Service 1990a, page IV–32) directs land managers to "…provide habitat requirements for its selected management indicator species."

Table 103 lists the terrestrial species selected as MIS in the Malheur Forest Plan. All 11 species have potential habitat present or have been documented in the analysis area, and effects of the project on these MIS will be assessed.

**Table 103. Management indicator species identified in the Malheur Forest Plan**

| Species | Representing | Habitat description | Habitat present in analysis area | Species present in analysis area |
|---|---|---|---|---|
| Lewis's woodpecker | Dead and defective wood habitat | Open, late-seral ponderosa pine forest, post-fire habitat, cottonwood | Yes (secondary) | Suspected |
| Red-naped sapsucker* | Dead and defective wood habitat | Riparian habitat with aspen, cottonwood | Yes | Suspected |
| Williamson's sapsucker | Dead and defective wood habitat | Open, late-seral ponderosa pine and mixed conifer forest, aspen and cottonwood | Yes | Documented |
| Downy woodpecker | Dead and defective wood habitat | Riparian habitat with aspen, cottonwood | Yes | Documented |
| Hairy woodpecker | Dead and defective wood habitat | Coniferous forests from low to mid elevation, post-fire habitat | Yes | Documented |
| Black-backed woodpecker | Dead and defective wood habitat | Post-fire habitat, beetle killed forest, conifer forests from subalpine to low elevations | Yes (secondary) | Suspected |
| Northern flicker | Dead and defective wood habitat | Forest habitat generalist | Yes | Documented |
| Rocky Mountain elk | Species commonly hunted | Forested mountains and meadows with suitable forage (grasses and forbs) | Yes | Documented |
| Pileated woodpecker | Old growth; dead and defective wood habitat | Closed canopy, late-seral subalpine, montane and lower montane forests | Yes | Documented |

| Species | Representing | Habitat description | Habitat present in analysis area | Species present in analysis area |
|---|---|---|---|---|
| American (pine) marten | Old growth | Closed canopy, late-seral subalpine and montane forests | Yes | Suspected |
| Three-toed woodpecker | Old growth lodgepole; dead and defective wood habitat | Subalpine and montane forests, lodgepole pine, post-fire habitat | Yes | Suspected |
| White-headed woodpecker | Dead and defective wood habitat, OFSS | Open, late-seral forests with ponderosa pine, post-fire habitat | Yes | Documented |

*Current taxonomy – replaces yellow-bellied and red-breasted sapsucker listed in the Malheur Forest Plan.

Viability of MIS is being assessed using the historical range of variability (HRV) concept comparing current amounts and distribution of habitat to historical conditions (Wisdom et al. 2000, Suring et al. 2011). Scientists assume that species are more likely to persist into the future under the conditions that remain most similar to the conditions that they persisted in during the past (Landres et al. 1999, Samson et al. 2002). By managing habitat within HRV, it is assumed that adequate habitat would be provided because species survived at those habitat levels in the past. Thus, if we manage current habitats within the historical range of variability, we are likely to do an adequate job of maintaining population viability for those species that remain, by providing quality habitat. The further current habitat conditions are from the HRV, the more likely it is that population viability would be compromised.

Vegetation data used to assess current habitat conditions for American pine marten, pileated woodpecker, black-backed woodpecker, and three-toed woodpecker are from the FSVEG Spatial Data Analyzer imputed dataset (see ForestWideWildlifeHabitatClassification.docx, in the analysis file). Estimates of HRV were derived for this DEIS (Countryman and Justice 2010). The HRV for dead wood is from DecAID unharvested vegetation plots for the Blue Mountains only (Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests; BlueMtsSnags2014.xlsx and BlueMtsDW2014.xlsx, in analysis file). Current conditions are from gradient nearest neighbor data (LEMMA; based on 2012 Landsat imagery).

### 3.9.4.1 Dead and Defective Habitat for Cavity Excavation Birds

Pedestrian surveys were completed throughout the project planning area during the 2014 field season. Dedicated old growth (DOG) and proposed replacement old growth (ROG) stands were surveyed more intensively. Detections of management indicator species (MIS) were recorded.

Because these MIS were selected to represent dead and defective wood habitat, this analysis and discussion focuses primarily on that habitat component. Additional information on cavity-excavating birds' habitat associations, distribution, and life history requirements is summarized in Mellen-McLean (2012a).

A few MIS woodpeckers are discussed in more detail due to conservation concerns. Black-backed woodpecker are ranked as vulnerable (S3) by NatureServe (**Error! Reference source ot found.**) and are discussed in more detail below. The pileated woodpecker and three-toed woodpecker are also MIS for old-growth habitats and they are further discussed in the Old-Growth Network section of this document. Detailed discussion of the white-headed woodpecker

and Lewis's woodpecker can be found in the Proposed, Endangered, Threatened, and Sensitive Species section of this document.

**Table 104. Conservation status of cavity-nesting management indicator species (MIS)**

| Species | USFS Sensitive | NatureServe Ranks[1] | |
|---|---|---|---|
| | | Global | OR |
| Black-backed woodpecker | | G5 | S3 |
| Downy woodpecker | | G5 | S4 |
| Hairy woodpecker | | G5 | S4 |
| Lewis's woodpecker | Yes | G4 | S2S3 |
| Northern flicker | | G5 | S5 |
| Three-toed woodpecker | | G5 | S3 |
| Red-naped sapsucker | | G5 | S4 |
| White-headed woodpecker | Yes | G4 | S2S3 |
| Williamson's sapsucker | | G5 | S4B S3N |

[1] NatureServe 2010
G5 or S5 – Widespread, abundant, secure
G4 or S4 – Apparently secure
G3 or S3 – Vulnerable
G2 or S2 – Imperiled

In general, populations of cavity-nesting birds have declined across the Blue Mountains compared to historical conditions, primarily due to reductions in the numbers of large snags (Wisdom et al. 2000). Of the cavity-excavating MIS, breeding bird surveys in Oregon have detected a statistically significant decrease in populations of the northern flicker between 1966 and 2010 (Sauer et al. 2011).

Current Malheur Forest Plan direction, as amended by the Eastside Screens, is to maintain snags at 100 percent of biological potential for all woodpecker species that occur on the Forest throughout the stand rotation. This equates to 2.25 snags per acre greater than 12 inches diameter at breast height (DBH) and 0.14 snags per acre greater than 20 inches DBH. Snags can be averaged over an area no larger than 40 acres. Snags should be left in a clumped distribution.

Rose et al. (2001) report that results of monitoring indicates that biological potential models are a flawed technique. New information about the ecology, dynamics, and management of decayed wood has been published since the biological potential concept was developed, and the state of the knowledge continues to change. However, until the Malheur Forest Plan is amended to reflect new science, 100 percent biological potential is the minimum number of snags that need to be maintained through the life of the stand rotation.

The latest science is incorporated into this analysis using DecAID Advisor (version 2.2) (Mellen-McLean et al. 2012). DecAID is an internet-based summary, synthesis, and integration (a "meta-analysis") of the best available science: published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience. In addition to data showing wildlife use of dead wood, DecAID also contains data showing amounts and sizes of dead wood across the landscape based on vegetation inventory data.

Data from unharvested plots are assessed separately and these data can be used as a **reference condition** to approximate the historical range of variability (HRV) of dead wood. There is debate among professionals about the impact fire exclusion has on stands relative to HRV of dead wood. One caveat to using these data, on the eastside in particular, is current levels of dead wood may be elevated above historical conditions due to fire suppression and increased mortality, and may be depleted below historical levels in local areas burned by intense fire or subjected to repeated salvage and firewood cutting (Mellen-McLean et al. 2012). Even with this caveat, these reference condition data are used in this analysis because they are some of the best data available to assess HRV of dead wood, even in eastside dry forests; they are the only available data showing distribution and variation in snag and down wood amounts across the landscape; and the data from unharvested stands are in the range of other published data on HRV of dead wood, even in the drier vegetation types (Mellen-McLean 2011). For a full discussion go to the website: http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/hrv-dead-wood-comparison.shtml.

A distribution analysis (http://www.fs.fed.us/r6/nr/wildlife/decaid-guide/distribution-analysis-green-tree.shtml) was used to determine how close current conditions for dead wood on the landscape match reference conditions. Existing conditions for down wood were derived by using gradient nearest neighbor (GNN) data (LEMMA). GNN produces pixel-based maps with associated snag and down wood data. These maps provide the direct data necessary to construct "current situation" histograms. GNN uses the same data that were used to develop the distribution histograms for DecAID. For more information see Ohmann and Gregory (2002), and go to the website: http://www.fsl.orst.edu/lemma/main.php?project=imap&id=home.

GNN data are based on 2000–2001 imagery and have been updated for fires through 2009 (analysis background and details on file at the Malheur National Forest).

The analysis area for the distribution analysis is larger than the project planning area and encompasses the Beech Creek and Grub Creek watersheds. The larger analysis area was needed because the project planning area is split by the two watersheds, and to meet the minimum analysis area size of 12,800 acres per wildlife habitat type recommended by the authors of DecAID (Mellen-McLean et al. 2012).

The distribution analysis results were compared to the needs of woodpecker species using tolerance levels and intervals (range between 2 tolerance levels) from DecAID. A tolerance interval is similar to the more commonly used confidence interval but with a key difference: tolerance intervals are estimates of the percentage of all individuals in the population that are within some specified range of values. In comparison, confidence intervals are estimates of sample means from the population of interest. For more information see Marcot et al. (2010) and go to the website: http://www.fs.fed.us/r6/nr/wildlife/decaid/pages/What-is-a-tolerance-level.html.

An applied use of a tolerance level is as follows. If the 50 percent tolerance level for snag density at pileated woodpecker nest sites in a specific wildlife habitat type is 7.8 snags per acre, the interpretation would be that 50 percent of nest sites used by pileated woodpeckers in that habitat have less than 7.8 snags per acre and 50 percent of nest sites used by pileated woodpeckers have more than 7.8 snags per acre.

### *Existing Conditions of Dead and Defective Habitat*

The ponderosa pine/Douglas-fir and eastside mixed-conifer wildlife habitat types (WHTs) occur in the analysis area in an adequate amount (>12,800 acres) for accurate analysis and are discussed below. Results of the DecAID distribution analysis are displayed in Figure 54 through Figure 57. Tolerance levels for woodpeckers in these WHTs are displayed in Table 105and Table 106.

#### Ponderosa Pine/Douglas-fir Wildlife Habitat Type

In the ponderosa pine/Douglas-fir wildlife habitat type (PPDF WHT), the landscape in the project planning area is near or above reference conditions for densities of large snags (>20 inches DBH) and small snags (>10 inches DBH) (Figure 54 and Figure 55). This WHT makes up approximately 14 percent and 2 percent of the Beech Creek and Grub Creek watersheds, respectively. There is less area lacking snags (zero snags/acre) than would be expected under reference conditions, and more area in the lower snag density classes. Distribution of snag densities across the Malheur National Forest in the PPDF WHT is similar to this landscape (USDA Forest Service 2014c).

Most woodpecker species using this WHT should currently have an adequate amount of snag habitat on the landscape. Large snag habitat for pileated woodpecker and Williamson’s sapsucker is rare in this WHT both currently and with reference conditions.

A weighted average between the Beech Creek and Grub Creek watersheds was used to calculate current conditions in this WHT so that enough acres were included for the most accurate analysis.

#### Eastside Mixed-Conifer Wildlife Habitat Type

In the eastside mixed-conifer wildlife habitat type (EMC WHT), the landscape in the project planning area is deficit in snag density classes above 2 snags per acre for large snags (>20 inches DBH), as compared to reference conditions (Figure 56). This WHT makes up approximately 33 percent and 19 percent of the Beech Creek and Grub Creek watersheds, respectively. Snag density classes above 2 snags per acre provide habitat above the 50 percent tolerance level for cavity-nesting birds in general, and the 30 percent tolerance level for pileated woodpecker and Williamson’s sapsucker. For snags larger than 10 inches DBH, the landscape is below reference conditions for snag density classes above 6 snags per acre (Figure 57). Distribution of snag densities across the Malheur National Forest in the EMC WHT is similar to this landscape (USDA Forest Service 2014c).

Snag habitat for cavity-nesting birds, except for white-headed woodpeckers, may be limiting in this WHT. Pileated woodpeckers and Williamson’s sapsuckers may be limited to more productive sites in this WHT where snag densities are expected to be higher (Bull et al. 2007, Ohmann and Waddell 2002).

The amount of the landscape in the highest density classes for snags from unharvested stands (DecAID data) may be somewhat inflated due to an excess of dense stands with more smaller trees susceptible to mortality than likely occurred historically. In addition, the data used in the calculation of reference conditions are from the late 1990s when spruce budworms were active in the Blue Mountains, which created high levels of tree mortality. However, the current deficit is departed enough from reference conditions that the departure likely cannot be totally explained by these situations. Lack of snags in this WHT in the Beech Creek watershed is likely due to past harvest, fire suppression, and firewood cutting.

Only data from the Beech Creek watershed was used in the analysis for this WHT, as it comprises about 85 percent of the Magone project planning area. Further, 23,225 acres of this WHT was recorded for the Beech Creek watershed, which is substantially more than the minimum 12,800-acre requirement for sound analysis.

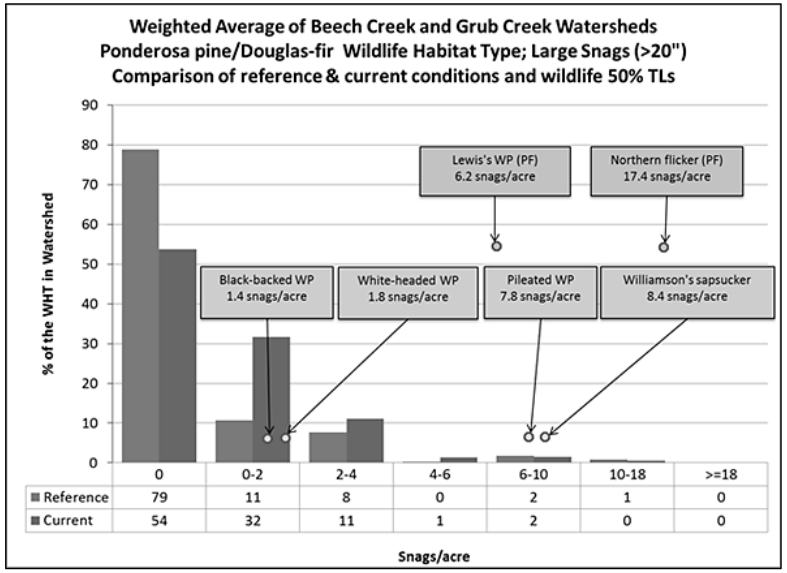


**Figure 54. Comparison of the historical range of variability (HRV) to current condition for snag density classes in the ponderosa pine/Douglas-fir wildlife habitat type portion of the Beech Creek and Grub Creek watersheds; snags >20 inches DBH, 50 percent tolerance levels for wildlife species. HRV reference condition derived from DecAID figures PPDF_L.inv-14, PPDF_S.inv-14, and PPDF_O.inv-14; wildlife tolerance levels from Tables PPDF_S/L.sp-22 and PPDF_PF.sp-22 (Mellen-McLean et al. 2012).**

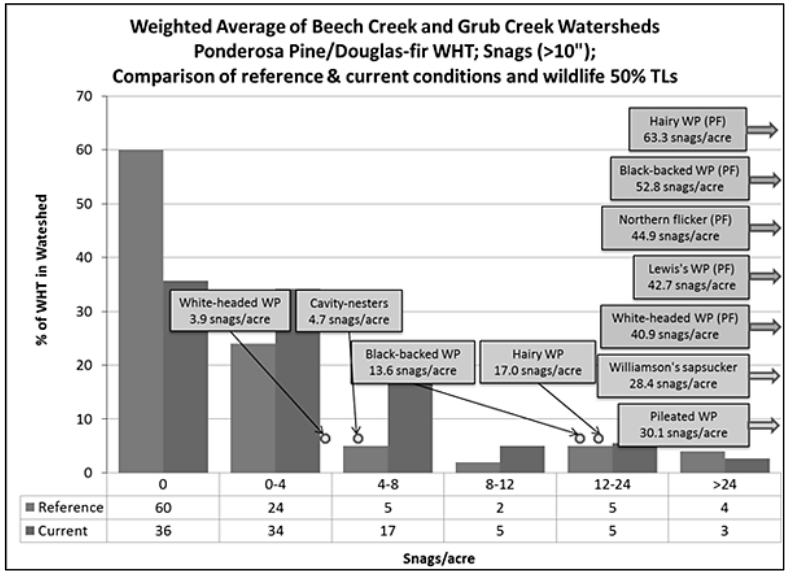


**Figure 55. Comparison of the historical range of variability (HRV) to current condition for snag density classes in the ponderosa pine/Douglas-fir wildlife habitat type portion of the Beech Creek and Grub Creek watersheds; snags >10 inches DBH, 50 percent tolerance levels for wildlife species. HRV reference condition derived from DecAID figures PPDF_L.inv-14, PPDF_S.inv-14, and PPDF_O.inv-14; wildlife tolerance levels from Tables PPDF_S/L.sp-22 and PPDF_PF.sp-22 (Mellen-McLean et al. 2012).**

**Table 105. Tolerance levels for woodpeckers occurring in the ponderosa pine/Douglas-fir wildlife habitat type**

| | Snag density/acre for 30%, 50%, and 80% tolerance levels | | | |
|---|---|---|---|---|
| | Green forests | | Recent post-fire | |
| **Species** | **>10 inches DBH** | **>20 inches DBH** | **>10 inches DBH** | **>20 inches DBH** |
| Black-backed woodpecker | 2.5, 13.6, 29.2 | 0.0, 1.4, 5.7 | 37.4, 52.8, 76.5 | |
| Hairy woodpecker | | | 39.2, 63.3, 100.0 | |
| Lewis's woodpecker | | | 24.7, 42.7, 70.6 | 0.0, 6.2, 16.1 |
| Northern flicker | | | 25.0, 44.9, 83.1 | 2.2, 17.4, 39.6 |
| White-headed woodpecker | 0.0, 3.9, 11.9 | 0.5, 1.8, 3.8 | 22.2, 40.9, 68.3 | |
| Williamson's sapsucker | 14.0, 28.4, 49.7 | 3.0, 8.4, 16.3 | | |

Source: DecAID Tables PPDF_S/L.sp-22 and PPDF_PF.sp-22.

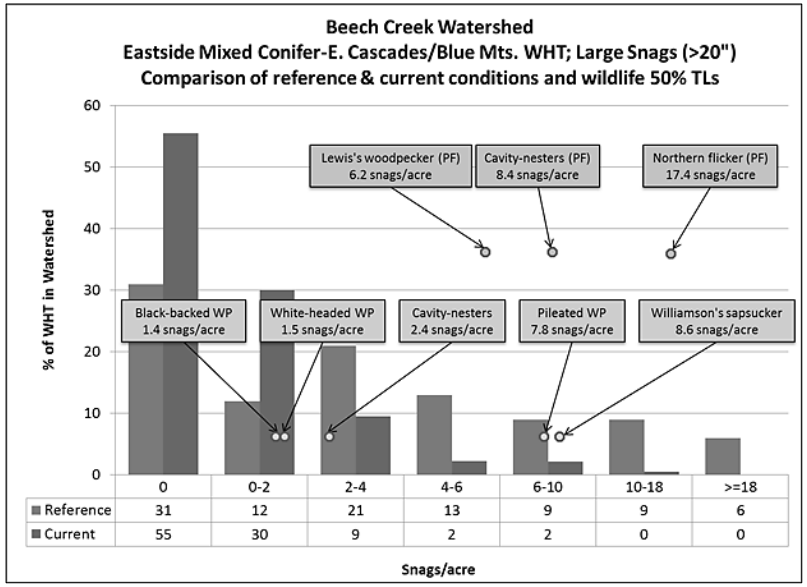


**Figure 56. Comparison of the historical range of variability (HRV) to current condition for snag density classes in the eastside mixed-conifer wildlife habitat type portion of the Beech Creek watershed; snags >20 inches DBH, 50 percent tolerance levels for wildlife species. HRV reference condition derived from DecAID figures EMC_ECB_L.inv-14, EMC_ECB _S.inv-14, and EMC_ECB _O.inv-14; wildlife tolerance levels from Tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

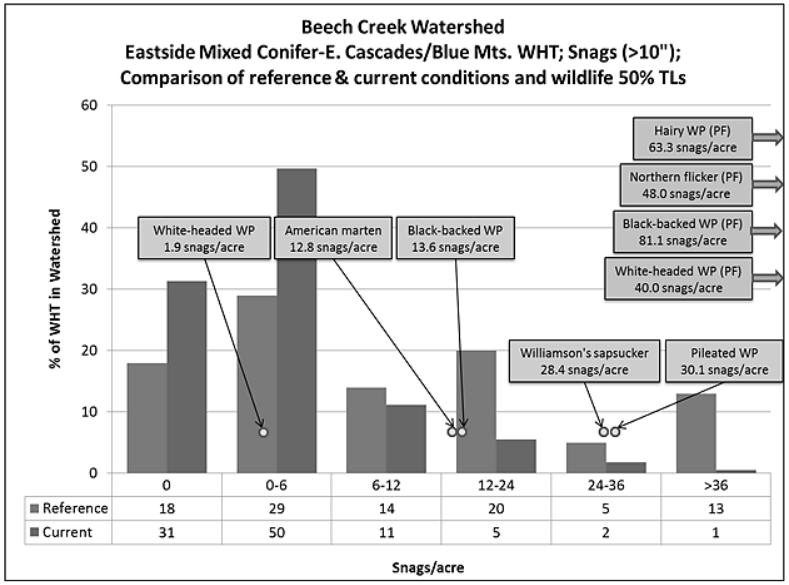


**Figure 57. Comparison of the historical range of variability (HRV) to current condition for snag density classes in the eastside mixed-conifer wildlife habitat type portion of the Beech Creek watershed; snags >10 inches DBH, 50 percent tolerance levels for wildlife species. HRV reference condition derived from DecAID figures EMC_ECB_L.inv-14, EMC_ECB _S.inv-14, and EMC_ECB _O.inv-14; wildlife tolerance levels from Tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

**Table 106. Tolerance levels for woodpeckers occurring in the eastside mixed-conifer wildlife habitat type**

| | Snag density/acre for 30%, 50%, 80% tolerance levels | | | |
|---|---|---|---|---|
| | Green forests | | Recent post-fire | |
| **Species** | **>10 inches DBH** | **>20 inches DBH** | **>10 inches DBH** | **>20 inches DBH** |
| Black-backed woodpecker | 2.5, 13.6, 29.2 | 0.0, 1.4, 5.7 | 57.2, 82.4, 119.2 | |
| Hairy woodpecker | | | 42.9, 67.2, 104.1 | |
| Lewis's woodpecker | | | 24.2, 39.5, 62.8 | 0.0, 6.2, 16.1 |
| Northern flicker | | | 26.8, 49.6, 84.1 | 2.2, 17.4, 39.6 |
| Pileated woodpecker | 14.9, 30.1, 49.3 | 3.5, 7.8, 18.4 | | |
| White-headed woodpecker | 0.3, 1.9, 4.3 | 0.0, 1.5, 3.8 | 18.6, 52.0, 98.7 | |
| Williamson's sapsucker | 14.0, 28.4, 49.7 | 3.3, 8.6, 16.6 | | |

Source: DecAID Tables EMC_S/L.sp-22 and EMC_PF.sp-22.

### *Effects on Dead and Defective Habitat*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Refer to the Silviculture Report and section for the expected future vegetation conditions under the no action alternative.

Under the no action alternative, existing levels of snags and downed wood would remain fairly constant in the area in the short- to mid-term. Since no management activities would be implemented, there would be no creation or loss of existing snags or downed wood from implementation activities. With absence of large-scale disturbance (e.g., fire, insect outbreaks) snags would continue to be recruited at or near existing rates. In the short- to mid-term, large diameter snags would continue to exist at their current levels, except for snags lost to firewood cutting. In the long-term, a decrease in snag densities would be expected over time. Without treatment, mortality would not be reduced in any stands and continued fire suppression and multi-strata development may increase the chance of insect infestations and disease). Insect and disease infestation could potentially increase mortality, and therefore increase snag densities over time. Downed wood densities would be expected to increase as existing snags fall.

In the short- to mid-term, habitat would remain unchanged and the no action alternative would have minimal effects on primary cavity excavators (PCEs) found within the project planning area, as current conditions would not change. Snag and downed wood habitats would continue to be provided at or near current rates for PCE species such as pileated woodpecker, Lewis's woodpecker, hairy and downy woodpecker, red-naped sapsucker, white-headed woodpecker, and northern flicker. In the long-term, potential disease and insects may increase foraging habitat for PCEs. Bark beetle outbreaks would be beneficial for foraging three-toed and black-backed woodpeckers. Although, conditions expected under the no action alternative could result in high fuels and a landscape vulnerable to large scale, stand-replacing wildfire.

In some areas of the project, continued increases in canopy could result in beneficial effects (security and cover) to pileated woodpecker and adverse effects (i.e., lack of mature pine for foraging) to white-headed woodpecker.

Riparian habitat, including aspen, and hardwood shrub communities required by some species would continue to be impacted by ungulate grazing/browsing and competition by conifers. Red-naped sapsucker and downy woodpecker could be negatively impacted by habitat loss due to continued decline in riparian habitat, hardwood shrub communities, and aspen stand quality and quantity.

Higher fuel loads would increase the chance of high-intensity wildfire within the analysis area (see Fire, Fuels, and Air Quality Report and section). Large-scale crown fire and stand replacement events would dramatically affect snag and downed wood densities. Since black-backed woodpeckers, three-toed woodpeckers, hairy woodpeckers, Lewis's woodpeckers, and northern flickers are strongly associated with post-fire environments, these species would benefit from increased insect populations and nesting habitats created by fire events. White-headed woodpeckers and Williamson's sapsuckers prefer mixed fire mortality associated with light to moderate intensity burns. These species would benefit, in the long-term, from smaller patch size fires that create some snags, especially those in larger size classes required for nest trees. Pileated woodpeckers, downy woodpeckers, and red-naped sapsuckers have much weaker associations with high-intensity post-burn habitats and would not likely benefit from those events (Hutto 1995, Saab et al. 2007).

The assumption is that snag creation due to endemic levels of insects, disease, and stress mortality generally equals the loss of snags through natural processes. However, due to the increased number of dense stands in the project planning area, wildfire risk is increased, which could lead to increased snags in larger areas than with active management. Alternative 1 has the greatest potential for the development of high density snag patches.

Although the no action alternative could result in snag creation due to endemic levels of insects, disease, and stress mortality, and result in a higher proportion of dense, fire-prone multi-strata habitat across the landscape, the event of an insect infestation or large wildfire is speculative.

**Conclusion** – The no action alternative would not affect dead and defective wood habitat and therefore would not contribute to a negative trend in viability for MIS dead and defective wood habitat dependent species, such as primary cavity excavators, on the Malheur National Forest.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects by Proposed Activity**

Please refer to Table 11 to review the differences in intensity (i.e., acres or miles) of proposed treatments under each alternative. It is assumed that as the intensity of the proposed treatments change, the level of expected effects discussed below would also change accordingly.

According to the DecAID analysis, the Magone project planning area is at or above HRV in small (>10 inch DBH) and large (>20 inch DBH) snags in the ponderosa pine/Douglas-fir wildlife habitat type (WHT). Conversely, snag habitat is deficit in the eastside mixed conifer WHT (see Management Indicator Species – Dead and Defective Habitat). In the short- to mid-term, the silvicultural and fire related activities proposed would likely maintain or slightly add to the snag deficit due to removal of hazard trees and any direct loss from fire in those WHTs. Snags would continue to be lost to firewood cutting as well. In the ponderosa pine/Douglas-fir WHT, where snag levels are above HRV, the incidental snag loss from project activities would not be expected to create levels below HRV. It is not expected that a substantial increase in the deficit would occur in the eastside mixed conifer WHT; losses from activities would be expected to be minor because no project activities would target snags, and only hazard trees would be intentionally removed. In the long-term, however, snag deficits would still be expected compared to HRV values used in DecAID in the eastside mixed conifer WHT, even in untreated areas. However, due to expected increased growth rates in treated stands, protection of snags and older trees (see project design criteria), additional mortality from prescribed and potential wildfire, incidental damage of trees from equipment in treatment units, and retention of LOS and connectivity corridors and expansion of the MA13 old growth network, increased snag quantity, larger snags, and higher quality snags would be expected to be distributed across the landscape in the long-term (50+ years).

**Silviculture Treatments and Prescribed Burning** – The Magone Project proposes thinning and prescribed fire to reduce fuel loads and restore forested stands toward the HRV, where stands are considered at risk. The effects of proposed treatments to primary cavity excavator management indicator species vary by species and the intensity of treatments. Some species have mixed effects, both good and bad.

Thinning prevents or slows the spread of crown fire by reducing surface and ladder fuels, raising crown base height, and breaking canopy continuity (Graham et al. 2004, Pollet and Omi 2002). In the short-term, implementation of thinning could result in some direct loss (consumed by fire) of snags, future snags, and down wood that are important stand attributes of healthy forests and critical components of wildlife and invertebrate habitat.

Wildlife and invertebrate species that depend on down wood, snags, dwarf mistletoe brooms, dense forest with abundant saplings and small poles, and closed canopy-forests for survival and reproduction, are likely to be detrimentally affected by thinning activities that alter these habitat elements due to the short-term loss in down wood. However, the DOG/ROG/PWFA system, discussed in the following Old Growth Network section, is part of an approximately 9,000-acre connectivity corridor in alternatives 2 and 4, and approximately 6,700 acres in alternative 3. With the proposed corridors, which include dense multi stratum stands and the overall large portion of the project planning area that would not be treated (34 percent in alternatives 2 and 4; 25 percent in alternative 3) as well as the inventoried roadless areas, current snag levels and rates of recruitment and retention would likely remain the same in the short-term, assuming the absence of large scale disturbance. Implementation of thinning is likely to result in the loss of snags, future snags, and downed wood as a result of increasing forest health and through the falling of hazard trees. Loss of snags to hazard trees is expected to be very low. However, none of the action alternatives would target snags, and project design criteria would retain snags and down wood habitat for primary cavity excavators. Some new snags may be created during implementation where equipment could damage live trees. Where only harvest and thinning occurs, treatment methods may provide more control over tree mortality and snag creation as opposed to burning. Silvicultural management practices such as variable density thinning prescriptions, which are being utilized for the project, would be expected to decrease project impacts to primary cavity excavator species such as Williamson's sapsucker and northern flicker due to the expected mosaic it would create, and the potential to retain "clusters" of snags as part of the leave patches.

Prescribed burning can alter or remove vertical and horizontal stand structure including snags and down wood. Studies by Hardy and Reinhardt (1998) document both the loss of existing snags during prescribed burning and recruitment of new snags through fire caused mortality. Variation in the severity of the burn influences residual stand characteristics, including the spatial distribution and availability of litter, down wood, snags, and vegetation (Jain et al. 2004). In most cases, prescribed fire results in increased structural complexity and habitat heterogeneity over time (Pilliod et al. 2006). However, multiple entries with prescribed fire (repeated burning), which is often the only way to reduce fuels effectively without thinning, may reduce the structural complexity of forest stands (Pilliod et al. 2006). Large prescribed fires, greater than 100 hectares, could also potentially homogenize the landscape for some species and decrease overall wildlife habitat (Brown et al. 2004). The level of loss and the replacement is dependent on fire intensity, time of year, local weather conditions, and fuel load. Prescriptions using only prescribed burning would exhibit the largest number of snags recruited from direct mortality, but burning activities have the potential to both consume existing snags and down logs and to create new snags. Any snag creation as a result of fire would benefit post-fire dependent species like the black-backed woodpecker. Although this pulse of snags would provide foraging for numerous woodpecker species, most snags likely would be too small to provide suitable nesting habitat. Design features are included to minimize consumption of existing habitat. Although some snags are expected to be lost as a result of implementation, losses would be expected to be minor across the landscape.

In areas where both thinning and prescribed burning occur, stand structure is at risk of becoming homogenized. Although thinning and prescribed fire would help restore historical stand structure, it is assumed in these areas that snag loss would be the highest due to the combination of loss from fire consumption and minimal loss from hazard tree felling, and stand structure would be most similar.

To maintain habitat diversity and create a mosaic of fire conditions, thinning using variable density spacing would be implemented and prescribed burn boundaries larger than 500 acres would require a wildlife biologist input to mitigate impacts to various wildlife species including primary cavity excavators. To further maintain habitat diversity, except in areas identified for specific riparian restoration treatments, ignition would be avoided within 100 feet of intermittent and perennial streams.

The season selected for implementation of prescribed fire activities has important consequences for wildlife and invertebrates (King et al. 1998). Some spring burns are conducted prior to green-up and many grasses, forbs, and some shrubs would sprout or resprout within a few weeks of a spring fire. Fall fires tend to burn hotter and consume more of the down wood and snags. Stands generally have a range of tree sizes, and the smaller diameter trees would most likely be killed by prescribed fire. These dead trees may provide temporary foraging habitat for some species, such as bark and wood-boring beetles and woodpeckers that feed on them. Fewer trees tend to be killed with spring burns than with fall burns due to higher moisture content. Consumption of large logs by fire is regulated by fuel moisture, which is often higher in spring and may minimize the loss of these important habitat elements compared to fall burns. In the spring, burning operations that remove large trees and snags would likely affect species nesting in tree canopies and cavities of snags or live tree boles. In addition, spring burning can also disrupt (i.e., displace), or halt (i.e., nest abandonment) breeding activities for many wildlife species, particularly those that are less mobile. There are numerous design criteria to help lessen or mitigate potential effects of prescribed burning (see Appendix C – Project Design Criteria).

All action alternatives propose non-commercial conifer removal for the purpose of mountain mahogany and bitterbrush enhancement, primarily along ridge tops and scabby openings where these upland shrub species were historically prevalent. Fire suppression and overall lack of management and disturbance has created late seral and in some cases depauperate[16] conditions for upland shrub species due to competing stem densities and canopy closure, primarily from western juniper and young ponderosa pine. These treatments were designed to remove young pines and western juniper to release and promote the upland shrub plant communities that would have historically existed on these sites. These activities would also include project design criteria to protect snags, decadent trees, and older legacy trees of all species. Due to the protection of current snags and decadent trees, and many of the conifers targeted for removal being young and smaller diameter, this treatment is not expected to have any effects to current or future snag density or distribution. Where suitable, some pines less than 21 inches DBH may be selected for girdling to create snags and improve densities and distribution across the project planning area. Because few trees would be selected for girdling, any benefits to primary cavity excavators and snag densities would be negligible.

In the short- to mid-term (1 to 25 years), treatments involving tree removal may affect old-growth species dependent on high canopy cover and structure, such as the Williamson's sapsucker. Species preferring large trees in open habitat types (e.g., hairy woodpecker, Lewis's woodpecker, and the northern flicker) would benefit immediately as a result of treatments. In areas treated exclusively with fire, it is anticipated a large pulse of small diameter snags would benefit black-backed woodpeckers. However, this benefit would diminish with any additional prescribed burning entries into the same units.

[16] Depauperate – Lacking in number and variety of species.

To minimize the effects to black-backed woodpeckers and numerous other wildlife species, prescribed burn boundaries larger than 500 acres would require a wildlife biologist input; ensuring heterogeneity is maintained on the landscape.

Treatments are considered beneficial to old-growth dependent species in the long-term (25+ years) as treated stands would better mimic historical, more resilient conditions. Old forest multi strata would be converted back to old forest single stratum stands where they occurred historically, benefitting the hairy woodpecker, Lewis's woodpecker, and northern flicker. Tree species and stand structure would better mimic historical more sustainable conditions. Younger structural stage stands (young forest multi strata, stem exclusion closed canopy, stem exclusion open canopy, stand initiation, and understory reinitiation) would be thinned to accelerate development of large diameter trees and restoration of old forest structure more similar to historical conditions. However, untreated patches would be left in harvest units, some several acres in size in larger treatments units to mimic historical mosaics common with low- to mid-severity fires. Retention of these "patches" of trees combined with the effects of prescribed fire would ensure those areas continue to provide avenues for snag creation, and provide foraging and nesting habitat in the short-term. Patches with higher densities of snags would be priority for leaving.

**Road Activities** – The effective closing or decommissioning of roads would secure potential habitat from the risks of firewood cutting and hazard tree removal. However, new and temporary road construction and road maintenance for haul would affect potential dead and defective wood habitat as snags could be removed from building and/or maintaining the road, firewood cutting (if road left open), and hazard tree removal. Continued unauthorized use on closed roads is likely to result in negligible effects, since activities like firewood cutting are currently ongoing.

**Aspen/Riparian Treatment and Protection** – Refer to the Silviculture Report for details regarding aspen stand treatment. Some old and decadent aspen may be directly reduced as a result of prescribed fire, which could affect species preferring hardwoods or hardwood snags in the short-term.

Prescribed fire would enhance natural regeneration as soil heating stimulates root suckering and existing suckers and saplings that are protected would become more vigorous. In the long-term, saplings would grow into larger size classes, becoming resistant to ungulate browsing as fences (where applicable) start to deteriorate. Overstory composition would change. Understory grass and forb cover would increase, as would deciduous riparian shade, root structure, and soil-holding capacity within the stands. Diversity of habitat would increase, especially foraging and nesting opportunities for neo-tropical migrants and cavity nesters including downy woodpecker and red-naped sapsucker. Genetic diversity of the treated aspen stands would be maintained and preserved. Black–backed woodpecker, Lewis's woodpecker, and Williamson's sapsucker would show little if any affect from the proposed aspen treatments as aspen provide a minor component of these species habitat. Habitat generalists such as hairy woodpecker and northern flicker would benefit slightly from the proposed aspen treatments.

Although there may be some disruption of nesting activities during implementation, species preferring riparian habitats and hardwoods would benefit as a result of activities associated with the proposed aspen and riparian treatments.

**Recreation Opportunity Improvements** – Each action alternative proposes some level of new hiking or bicycle trail construction, designating hiking/biking trails on existing roads, trailhead development or improvement, employing interpretive signs, and recreation enhancement activities around Magone Lake.

As new miles of trail are developed and maintained, a subsequent number of dead and defective trees along those trails would likely be identified as 'hazard' or 'danger' trees. For the safety of the construction and maintenance crews, as well as trail users, these trees would be removed. It is currently not practical to try to determine the number of snags that would be removed under each alternative, however it is expected that a substantial number of dead or dying trees would be removed; increasing with proposed trail miles. Further, future trees becoming decadent along the trails would also likely be removed as danger trees, potentially resulting in a substantial or even total loss of all current and future snags in areas immediately adjacent to the proposed new trails. In areas where trails would be designated on existing roads, the snag loss would not be beyond current levels as hazard trees are currently removed from roadways. Snags are also lost to firewood cutting along roads. Un-designating 3.9 miles of existing trails would eliminate the need for hazard tree removal and thus allow snags densities to increase in the areas immediately adjacent to these trails over time.

Improving trails, developing new day use areas, and modifying and constructing new docks around the lake could result in an increase in the areas regularly used by recreationists and could potentially increase the removal of snags identified as hazards. Any snags removed would directly remove potential nesting and foraging areas for woodpeckers.

Trees felled into or near Magone Lake for use as "fish sticks" under the action alternatives could also reduce the number of future snags, although trees selected for "fish sticks" would mostly be 8 to 12 inches DBH. By selecting smaller trees, the larger trees more valuable as future snags and potential nesting and foraging trees would be retained.

#### 3.9.4.2 Black-Backed Woodpecker

Below is a summary of black-backed woodpecker ecology important to providing information pertinent to assessing impact of the project on the species. For additional details see Mellen-McLean (2013) in the analysis file. Also see Hutto and Gallo (2006), Goggans et al. (1988), Nielsen-Pincus and Garton (2007), Dudley (2005), Haggard and Gaines (2001), Saab et al. (2009), and Hanson et al. (2012).

Black-backed woodpeckers are associated with coniferous forests across northern portions of North America. Recently burned conifer forests or insect-infested forests provide key conditions for nesting and foraging, as the birds require conditions that produce bark and wood-boring beetles. They reach highest densities and reproductive success in areas with high densities of trees recently dead (fewer than 5 years). Nesting rarely occurs in burned areas where salvage logging has occurred (Cahall and Hayes 2009; Hutto and Gallo 2006; Saab et al. 2007).

Black-backed woodpeckers do occur in dense, undisturbed forests in low densities. These secondary habitats may be important areas for maintaining the birds between disturbance events, and serve as a source for future habitat when disturbance occurs in the stands (Hanson et al. 2012).

Snags provide nesting, roosting, and foraging habitat for black-backed woodpeckers. They use smaller snags than many other woodpecker species, ranging from about 11 to 15 inches DBH. Snags used are recently dead trees of a wide variety of conifer species (Mellen-McLean et al. 2013).

Black-backed woodpeckers are considered vulnerable in the state by Oregon Department of Fish and Wildlife and NatureServe. They are considered vulnerable primarily due to the following threats and risks: salvage of dead trees, fire suppression, and treatments to reduce stand densities.

The U.S. Fish and Wildlife Service is currently reviewing the black-backed woodpecker to determine if listing two populations that occur in Oregon as either subspecies or distinct population segments under the Endangered Species Act is warranted (USDI FWS 2013b).

### *Existing Conditions for Black-Backed Woodpecker*

The number of acres burned by wildfire across the western United States in recent years has reached levels that occurred in the early 1900s prior to fire suppression (Littell et al. 2009). Climate change is also expected to increase fire frequency in the future (McKenzie et al. 2004, Westerling et al. 2006) and thus should provide a continual supply of habitat for the black-backed woodpecker.

A viability assessment completed for the Blue Mountains Forest Plan Revision indicates moderate concern for the black-backed woodpecker on the Malheur National Forest (USDA Forest Service 2014c, Wales et al. 2011). The analysis was weighted heavily to post-fire habitat, but only included fires through 2006, thus did not include recent large fires that have occurred on the Forest. Little salvage logging has occurred in these recently burned areas which can provide habitat for approximately 5 years post-fire. On the Forest, approximately 114,000 acres of wildfire have occurred since 2009, with salvage occurring on 250 acres within the Parish Cabin fire. These post-fire areas are likely contributing to black-backed woodpecker habitat. Within the project planning area, recent fire is limited to the Cornett Fire in 2013 that burned approximately 20 acres, and the OR-MAF-042 fire that burned approximately 24 acres in the Nipple Butte Inventoried Roadless Area. Additionally, the Grouse Creek Complex burned with 0.2 miles of the project planning area on private land. Although recent post-fire habitat suitable for black-backed woodpecker is limited to two small patches, secondary habitat does exist.

**Warm Dry Sites—**In drier areas, mid- and late-seral forests that provide secondary habitat are well above the historical range of variability (HRV) across the Forest (Wales et al. 2011).

In the ponderosa pine/Douglas-fir wildlife habitat type (WHT), snag densities are above HRV in unburned stands at the 30 and 50 percent black-backed woodpecker tolerance levels for snags >10 inches, and near HRV at the 80 percent tolerance levels (Figure 58). Under natural conditions, only about 4 percent of the area would be expected to have more than 24 small snags per acre, which includes the 29.2 snags per acre required to meet the 80 percent tolerance level for black-backed woodpeckers.

In the eastside mixed-conifer WHT, large snag densities are well above HRV in unburned stands at the 30 and 50 percent black-backed woodpecker tolerance levels (Figure 58). However, small snag densities are well below HRV for the 50 and 80 percent black-backed woodpecker tolerance levels. Under natural conditions, about 5 percent of the area would be expected to have between 24 and 36 small snags per acre, where the 80 percent tolerance level for black-backed woodpeckers would be expected.

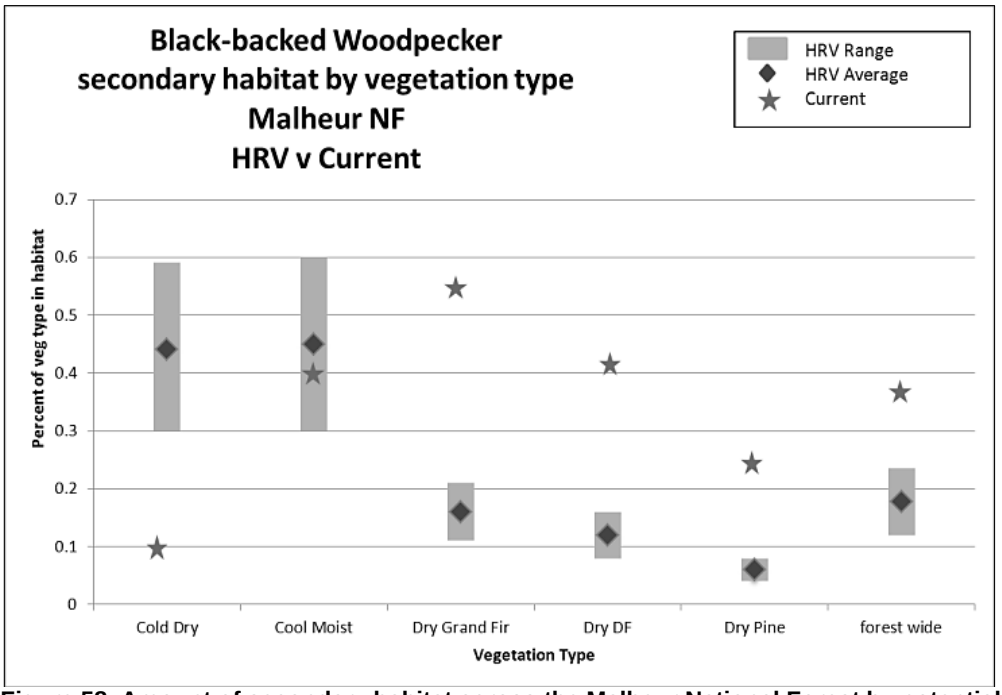


**Figure 58. Amount of secondary habitat across the Malheur National Forest by potential vegetation type compared to the historical range of variability (HRV). Secondary habitat is considered closed canopy stages of mid- and late-seral forested stands (data from Wales et al. 2011).**

The amount of the landscape in the highest density classes for snags for reference conditions may be somewhat inflated due to an excess of dense stands with smaller trees susceptible to mortality than likely occurred historically. In addition, the data used in the calculation of reference conditions are from the late 1990s when spruce budworms were active in the Blue Mountains, which created high levels of tree mortality. However, the current deficit is departed enough from reference conditions that the departure likely cannot be totally explained by these situations.

Due to the limited extent of recent fire in the analysis area, the current amount of unsalvaged post-disturbance habitat is probably not providing adequate amounts of habitat with high snag densities in this WHT. The high densities of snags provided by stand-replacing disturbances are transitory and only provides habitat for black-backed woodpeckers for about 5 years post-disturbance.

**Cool/Cold Sites—**Mid- and late-seral forests that provide secondary habitat are within or above the historical range of variability (HRV) across the Forest but well below HRV for Cold Dry forests (Wales et al. 2011). These forests are susceptible to stand replacing fire and insect outbreaks and thus are likely to provide some primary habitat in the future; however, the amount of Cold Dry forest is too low to solely provide an adequate, continual supply of habitat for the black-backed woodpecker.

Snags are also critical habitat components for the black-backed woodpecker. Currently in the eastside mixed-conifer WHT, snag habitat in the project planning area is below HRV in the higher density classes. Conversely, in the ponderosa pine/Douglas-fir WHT, the project planning area is near or exceeding HRV values for snag density.

Habitat queries run for the Malheur National Forest (USDA Forest Service 2014c) indicate there is approximately 654,838 acres of black-backed woodpecker secondary habitat available forest-wide. It is estimated there are approximately 14,127 acres of secondary black-backed habitat found within the Magone project planning area, or approximately 2 percent of the overall habitat on the Forest.

### *Effects to Black-Backed Woodpecker*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities are proposed. Tree mortality in some lodgepole pine stands, as well as grand fir and other plant association groups within the project planning area is occurring from insects and disease, which is exacerbated by high stand densities. Most of this mortality is occurring in the less than 20 inch DBH size classes, although some larger trees are also being affected. Under the no action alternative, this trend would continue and mortality would likely increase into the future.

Smaller scale disturbances similar to historical fire events or insect outbreaks would benefit black-backed woodpeckers. Large-scale events outside of the historical range of variability would also benefit black-backed woodpeckers in the short- to mid-term, for about 5 years post-disturbance, but then may be detrimental in the long-term since replacement trees that ultimately provide future snags could take a long time to develop.

Based on forest-wide modeling, mid- and late-seral forests that provide secondary habitat are well above HRV across the Forest (Wales et al. 2011). These forests are susceptible to stand replacing fire and insect outbreaks and thus are likely to provide more primary habitat in the future. The number of acres burned by wildfire across the western United States in recent years has reached levels that occurred in the early 1900s prior to fire suppression (Littell et al. 2009). Climate change is also expected to increase fire frequency in the future (McKenzie et al. 2004, Westerling et al. 2006) and thus should provide a continual supply of habitat for the black-backed woodpecker.

**Conclusion** – In the short-term, the no action alternative may benefit black-backed woodpecker as a result of a higher likelihood of bug kill and fire mortality. In the long-term, large-scale events within the project planning area may render the area unsuitable until future snags develop. Alternative 1 would not contribute to a negative trend in viability on the Malheur National Forest for black-backed woodpeckers.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Generally, thinning and fuel reduction treatments combined would render treated stands unsuitable for black-backed woodpeckers. Although some tree mortality would be expected in burn units, therefore providing small pockets of nesting or foraging habitat for black backed woodpeckers; thinning and burning would have overall negative effects to black-backed woodpecker by reducing stand density and cover, thus reducing overall nesting and foraging habitat. However, in 2015 black-backed woodpeckers were documented nesting and foraging near the fishing dock in the Magone Lake recreation area, approximately 2 to 3 meters from the hiking trail. This suggests that black-backed woodpeckers may utilize more open habitat than previously considered. Further, black-backed woodpeckers may tolerate higher levels of disturbance.

Rendering stands less susceptible to fire and insect outbreaks would reduce the likelihood of any future fires or natural disturbances and therefore reducing potential black backed woodpecker habitat. However, the extensive DOG/ROG/PWFA areas and connectivity corridors being left untreated would leave those stands and habitats therein in their current (short-term) and increasingly decadent state (mid- to long-term) and susceptible to insect infestations and wildfires. The project planning area has historically experienced a frequent, mixed severity fire history (see Historical Conditions section in Silviculture and Fire, Fuels, and Air Quality reports and sections) so it would be expected some of these untreated areas would eventually burn and provide habitat.

Alternative 3 would create the highest proportion of open forest, and would therefore be expected to have the highest level of effect on secondary black-backed woodpecker habitat. Alternative 2 would increase open forest, but would only marginally decrease old forest multi-strata habitat in the short-term. Dense, old multi-strata forest would remain at current levels (percentage HRV) in the short-term under alternative 4. In the long-term (2055 modeled stand structure), older multi-strata forest would increase from current levels and exceed HRV under any of the action alternatives. Young-forest multi strata would decrease in the short- and long-term under all action alternatives.

**Cumulative Effects to Dead and Defective Habitat and Black-Backed Woodpeckers**

The area considered for cumulative effects is the Beech Creek watershed. All of the proposed activities have been evaluated for their cumulative effects on species that use dead and defective wood. The following discussion focuses on those past, ongoing, and foreseeable future activities that may contribute positive or negative effects. 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 excavators populations dependent on these habitat features across the analysis area. These activities have created the existing condition of dead wood habitats described in the existing condition section.

Present actions include thinning and burning activities in the County Road 18 Healthy Forest Restoration Act Project. The 18 Road Project includes 1,200 acres of commercial thinning, 1,600 acres of non-commercial thinning, and prescribed burning to create strategic fuel breaks adjacent to County Road 18. The Magone Project combined with the effects of hazard tree removal and unauthorized firewood cutting along the 18 Road corridor would result in additive effects to snag density departures. Activities implemented in the 18 Road Project generally result in more open, single-strata habitat with a cleaner understory. The treated stands in this project are more resilient and less susceptible to insect and fire disturbance; likely contributing to fewer snags being created in these stands in the short- to mid-term.

Other reasonably foreseeable future projects authorized under the Malheur National Forest Aquatic Restoration Decision (Table 14) could have some additive effects to the proposed project. Particularly riparian enhancement thinning, where large/coarse woody debris would be tipped and added into streams, could reduce future large snag densities, although no snags would be targeted. Reducing lodgepole encroachment along 3 miles of Tinker Creek could decrease suitable secondary habitat for black-backed woodpeckers; and potentially three-toed woodpeckers depending on actual presence. Riparian shrub enhancement and planting would likely have a negligible effect to most dead and defective habitat obligates. However, some species like the red-naped sapsucker and downy woodpecker would likely see additive beneficial impacts from these activities.

Other projects similar to the proposed Magone Project are currently in implementation stages across the Malheur National Forest including Galena, Damon, Soda Bear, and Starr on the Blue Mountain Ranger District.

Firewood cutting and fire suppression are ongoing.

Reasonably foreseeable future actions include the project planning areas associated with accelerated restoration (e.g., Big Mosquito and Camp Lick) which would propose to move current vegetation conditions towards the historical range of variability, and likely include similar proposals of thinning, prescribed burning, aspen/riparian treatments, and upland shrub enhancement among other activities.

Past timber harvest activities and associated road construction in the analysis area affected snag densities by decreasing habitat from road construction and increasing accessibility of the area to firewood cutting. Snags that pose a hazard to workers and equipment, not only within units but along haul routes, would be felled. It is likely that firewood removal would be highest during implementation of the project and subside once project implementation is over.

Firewood cutting is having a negative effect on species requiring snags and down wood, such as raptors, pine marten, and cavity-nesting species. Recent increases in the amount of large pine snags targeted for woodcutting, added to impacts from the currently allowable firewood guidelines (16 cords), may affect the amount of available nesting and roosting habitat for a variety of species. Firewood cutting, in association with high road densities, also has the potential to eliminate habitat for cavity nesting species, such as all PCEs including black-backed woodpeckers.

Primary cavity excavators (PCEs) are expected to be impacted by some of these cumulative present and foreseeable future actions, such as snag and down wood reduction and habitat fragmentation related to large-scale thinning and underburning treatments, including the 18 Road Project. Restoration of HRV in the dry forest types is expected to reduce the risk of uncharacteristic disturbances such as severe wildfire and insect epidemics that could result in an undesirable ratio of open and closed canopy habitats. Substantial reduction of wildfire and insect/disease related snag and downed wood creation would impact PCE species such as black-backed woodpecker, Lewis's woodpecker, and hairy and downy woodpeckers.

Fire activity within close proximity to the Magone project planning area is described in the Historical Conditions section of the Silviculture and Fire, Fuels, and Air Quality reports and sections. Although small, recent (<5 years) post-burn areas in the project planning area created small pulses of snags that are likely providing additional snag habitat in the short- to mid-term. Snags and down wood from these fires are expected to continue to provide habitat for primary cavity excavators, further mitigating effects during the implementation of the proposed activities.

Fire suppression, however, has resulted in dense, multi-strata stands and snag and down log densities are generally higher in these stands than less dense ponderosa pine stands. Fire suppression has led to the buildup of ground fuels and overstocked stands. These overstocked stands are at risk of competition pressure, which increases the potential of insects, disease, and wildfires. These characteristics provide habitat for primary cavity excavators. However, these stands are at risk of a large-scale fire. Project design criteria were established to retain and recruit a sufficient amount of dead and defective wood; therefore, the Magone Project would decrease the risk of large-scale fire, while retaining habitat for primary cavity excavators.

Decreasing the risk of large-scale fires could potentially decrease the potential for increased post-fire habitat desirable to black-backed woodpeckers.

Under the action alternatives, changes in dead wood habitats would be considered minor on a forest scale. In the short- to mid-term, the actions would contribute cumulatively to the loss of snag and down wood habitat from other similar projects currently being implemented or analyzed across the Forest, and a potential decrease in green tree mortality rates. Project design criteria would aid in mitigating the initial loss of snags in the project planning area. In the long-term, snag levels would likely decrease as a result of increased forest health and multiple entry underburning. As trees respond to proposed activities, increased vigor and health would have cumulative effects on those species, which prefer dead, insect infested trees susceptible to fire. However, in the long-term, stand structure would better mimic historical sustainable conditions, and snag levels would be similar to those reported by Matz (1927).

When the past, present, and reasonably foreseeable actions are considered in combination with the action alternatives there is not expected to be a significant change in snag densities across the watershed. However, the proposed project and associated action alternatives would not move snag density and distribution towards historical conditions as reported in DecAID, rather it would likely add to current deficits where they exist.

The high-density snag categories are typically created from wildfires and are not expected to occur from prescribed fire activities that are part of the proposed actions. Returning fire to the watershed has the potential to create small snag patches within the watershed but is not expected to move overall snag densities in the high-density category towards HRV.

Together with fire suppression and other landscape objectives that limit or discourage large beetle outbreaks, the project would contribute to a small negative trend in black-backed woodpecker habitat across the Forest. While some additive cumulative effects may be anticipated, projects are consistent with Malheur Forest Plan objectives because the project is consistent with the standards and guidelines relating to MIS – PCE species.

**Conclusion for Dead and Defective Habitat** – In the short-term, there could be some negative effects to cavity excavating species from disturbance and direct loss of snags during implementation through hazard tree removal and consumption from prescribed fire. However, snags would not be targeted with thinning treatments and true hazard trees needing removal are expected to be rarely encountered during vegetation actions. Project design criteria are in place to decrease or prevent loss from prescribed fire, and fire would likely add snags from direct mortality. Thinning over-stocked stands could eventually help move multi-strata habitat towards older, single-strata habitat, benefitting the hairy woodpecker, Lewis's woodpecker, and northern flicker. Williamson's sapsucker would benefit as all other thinning would accelerate younger structural stage stands to develop large diameter trees and restore resilient old forest structure. However, more resilient stands would be less susceptible to mortality due to stress, insects, or fire, and could potentially produce even fewer snags than current conditions in the mid-term, resulting in further snag density departures from HRV in the eastside mixed-conifer WHT that makes up about 33 percent and 19 percent of the Beech Creek and the Grub Creek watersheds, respectively. As mentioned above, only the Beech Creek watershed was considered in the DecAID analysis, as it comprises 85 percent of the project planning area. The ponderosa pine/Douglas-fir WHT would be expected to continue to provide snags at or above the HRV.

In the long-term (50+ years), stand structure would better mimic historical conditions, become comprised of larger, older trees and eventually become more decadent. At this point, these stands would likely start producing higher quantities of larger, better quality snags of more desirable species, and therefore would ultimately be beneficial to cavity excavating species.

The net change in road densities is negligible under all action alternatives and is not expected to have a substantial effect on snag or downed wood loss. Although some additional loss would occur in the short-term, decommissioning and effectively closing roads would likely eliminate some future loss of snags from firewood collectors and hazard tree removals. Effectively re-closing roads temporarily opened for haul and temporary roads (constructed for haul) would be critical to mitigate potential additional losses from firewood cutting.

Aspen stand and riparian area treatments would benefit the downy woodpecker and red-naped sapsucker, and likely have negligible effects to other PCEs. Only 18 acres of aspen treatment are proposed under each action alternative and reasonably foreseeable projects authorized under the Aquatic Restoration Decision would not directly remove snags or remove downed wood once felled. These activities would not treat large, contiguous blocks of habitat resulting in habitat that is not highly altered from its existing condition.

Under all action alternatives**, a slight decrease in forest-wide dead, down, and defective habitat or population trends for primary cavity excavators would be expected as a result of implementation in the short-term**. In the mid- to long-term, habitat would be expected to recover and improve and conditions would better mimic HRV. However, due to the more extensive trail system, less area designated as connectivity, and substantially more acres and units treated, alternative 3 would have a greater effect on dead and defective habitat. All alternatives would provide more resilient stands leading to larger, older age class trees eventually becoming decadent and producing higher quality dead and defective habitat. Therefore, no forest-wide threats to any PCE's population viability would be expected from implementation of the action alternatives in this project planning area. However, implementing alternative 3 would result in the project planning area likely being highly departed from historical snag levels.

**Conclusion for Black-Backed Woodpecker** – All of the action alternatives would impact suitable black-backed woodpecker habitat in the project planning area. However, the highest level of activities proposed under alternative 3 would impact less than 2 percent of suitable habitat at the Forest-level, and current conditions greatly exceed HRV for black-backed woodpeckers. The overall direct, indirect, and cumulative effects would result in a small negative trend of habitat. The loss of habitat would be insignificant at the scale of the Forest. Further, wildfire events are possible, or likely, at the Forest-level, which could create more suitable habitat and partially mitigate any negative effects of the project. The Magone Project is consistent with the Malheur Forest Plan, and thus continued viability of the black-backed woodpecker is expected on the Malheur National Forest.

### 3.9.4.3 Rocky Mountain Elk

Rocky Mountain elk were selected as a management indicator species (MIS) for the Malheur National Forest due to their economic and social value, and for their documented response to changes in forest cover, forage quality, and road densities.

Thomas et al. (1988) developed the habitat effectiveness index (HEI) model for estimating elk habitat effectiveness on the landscape. The existing condition and the effects analysis by alternative for elk habitat effectiveness were evaluated using the HEI model, marginal and satisfactory cover percentages, and open road densities. Existing big game cover was designated using stand exams, most similar neighbor analysis using geographic information system (GIS) layer files, aerial photographs, and ground reconnaissance. Open road densities were calculated using the District access travel management database. Values were estimated by winter range and summer range in the East Fork Beech Creek and Grub Creek subwatersheds.

The Malheur Forest Plan establishes minimum standards for HEI for both summer range (USDA Forest Service 1990a, pages IV–27 to IV–29) and winter range (USDA Forest Service 1990a, pages IV–69 to IV–73). In addition, the Malheur Forest Plan identifies minimum standards for retention of satisfactory, marginal, and total cover. The Forest Plan also establishes standards for open road density.

The Malheur National Forest defines elk and deer habitat by four broad categories based on vegetative conditions: satisfactory cover, marginal cover, hiding cover, and forage. These categories generally reflect the gradation of forest vegetation from late structural stages to early structural stages. A mosaic of cover and forage areas with adequate water is preferred. Definitions follow:

- Forage areas are all areas that do not meet the definition of satisfactory or marginal cover. Forage consists of all woody and non-woody plants available as a food source. In general elk prefer forage dominated by grasses.
- Satisfactory cover is a stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or more than 50 percent for ponderosa pine and 60 percent for mixed conifer. Satisfactory cover is considered superior to marginal cover.
- Marginal cover is a stand of coniferous trees 10 or more feet tall with an average canopy closure equal to or more than 40 percent. As with satisfactory cover, marginal cover must be at least 10 acres in size and 600 feet wide. Marginal cover and satisfactory cover are also sometimes referred to as thermal cover. Often marginal cover also provides suitable hiding cover.
- Hiding cover, also referred to as security cover, is vegetative cover that hides at least 90 percent of an adult elk at 200 feet. Hiding cover provides a visual barrier between big game animals and potential predators or sources of disturbance, and is especially important during hunting season when big game alter their travel patterns to avoid humans.

### *Existing Condition of Rocky Mountain Elk Habitat*

For analysis, the project planning area was divided into winter range and summer range in the East Fork Beech Creek and Grub Creek subwatersheds. Winter range is primarily at lower elevations where forested areas are interwoven with non-forested grasslands and shrublands, and for HEI, portions of the subwatersheds not classified as winter range are considered summer range. Further, the 5,795 acre Nipple Butte Wildlife Emphasis Area (WEA; MA 21) is included in the project planning area and was considered for independent HEI analysis as there are different standards for this management area in the current Malheur Forest Plan (USDA Forest Service 1990a, pages IV–131). The Nipple Butte WEA is entirely within the East Fork Beech Creek subwatershed, and nearly entirely in winter range. The WEA was also included in the data for the East Fork Beech Creek winter and summer range.

There are approximately 9,207 acres of winter range and 13,733 acres of summer range in the East Fork Beech Creek subwatershed portion of the project planning area, and about 2,877 acres of winter range and 1,269 acres of summer range in the Grub Creek subwatershed portion of the project planning area.

Malheur Forest Plan standards are different for summer range, winter range, and WEAs. Table 107 displays the existing HEI values in the Magone project planning area. In summer range, forage is not considered a limiting factor therefore a forage value is not used in calculations.

**Table 107. Existing habitat effectiveness index values, cover percentages, and open road densities for East Fork Beech Creek, Grub Creek and Nipple Butte Wildlife Emphasis Area (WEA)**

| Subwatershed | HEc | HEs | HEf | HEr | HEcsfr | %S | %M | % total cover | Open road density miles/mile$^2$ |
|---|---|---|---|---|---|---|---|---|---|
| **Summer Range** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.3* | *0.3* | *N/A* | *0.4* | *0.4* | *12* | *5* | *20* | *3.2 (1.5*)* |
| East Fork Beach Creek | 0.82 | 0.55 | N/A | 0.54 | 0.59 | 51.9 | 28.3 | 80.3 | 1.48 |
| Grub Creek | 0.71 | 0.66 | N/A | 0.41 | 0.55 | 31.8 | 45.5 | 77.4 | 2.82 |
| **Winter Range (MA-4a)** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.4* | *0.3* | *0.4* | *0.5* | *0.5* | *10* | *10* | *25* | *2.2(1.0*)* |
| East Fork Beach Creek | 0.81 | 0.64 | 0.50 | 0.68 | 0.65 | 45.4 | 27.9 | 73.4 | 0.72 |
| Grub Creek | 0.67 | 0.46 | 0.50 | 0.47 | 0.52 | 29.5 | 57.9 | 87.4 | 2.18 |
| ***Nipple Butte WEA (MA-21)*** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.5* | *0.6* | *0.5* | *0.6* | *0.5* | *20* | *20* | *40* | *1.5* |
| Nipple Butte WEA | 0.83 | 0.69 | 0.5 | 0.97 | 0.73 | 46.8 | 23.8 | 70.6 | 0.05 |

*Desired open road density based on Malheur Forest Plan Record of Decision.
HEc = habitat effectiveness derived from the quality of cover
HEs = habitat effectiveness derived from the size and spacing of cover
HEf = habitat effectiveness derived from the quantity and quality of forage; HEf is not used in summer range.
HEr = habitat effectiveness derived from the density of roads open to vehicular traffic
%S = Satisfactory Cover, %M = Marginal Cover, % Total Cover = %S + %M
N/A = Not Applicable. HEf is not used for summer range.

Forage consists of all woody and non-woody plants that are available to livestock or wildlife as a food source. Browsing refers to foraging on woody plants, typically hardwood shrubs or trees. In general, deer prefer browse forage such as shrubs and forbs while elk prefer forage dominated by grasses.

In summer range, all values meet or exceed Malheur Forest Plan standards. Both subwatersheds meet the standard for open road density (<3.2 miles of open road per square mile) for summer range. However, the actual number of “used” roads would be expected to be higher as many officially closed roads on the Malheur National Forest regularly experience unauthorized use. Total, marginal, and satisfactory cover all exceed the Malheur Forest Plan standards.

Winter range occurs in both subwatersheds. In all winter range in the project planning area, the habitat effectiveness index (HEI) values exceeds the Malheur Forest Plan standards; however, the HEI value is just below standards in winter range in the Grub Creek subwatershed. Winter range open road densities meet Malheur Forest Plan standards in both subwatersheds.

Although open road densities meet Malheur Forest Plan standards, both summer and winter range in the Grub Creek subwatershed are above the desired road density based on the Malheur Forest Plan (<1.5 miles per square mile and <1.0 mile per square mile, respectively). In winter range total, satisfactory, and marginal cover exceeds Malheur Forest Plan standards.

Although HEI and cover requirements are meeting or exceeding Malheur Forest Plan standards, cover requirements are not always compatible with the historical range of variability. This conflict is apparent in Hot Dry and Warm Dry forests dominated by ponderosa pine. Historical conditions and fire return intervals favored large blocks of trees with canopy closure too low to support satisfactory or marginal cover. Today, cover requirements are being met on many ponderosa pine sites; however, stands are overstocked and at high risk to bark beetle and severe wildfires. Cover levels may not be sustainable. This inherent conflict may be even more relevant in winter range, which is often located in low elevation, Hot Dry and Warm Dry forests dominated by ponderosa pine. Unfortunately, tree thinning, the treatment that most effectively reduces beetle and fire risk, also reduces the effectiveness of a stand as cover.

**Elk Populations**

Big game management on the Malheur National Forest is a cooperative effort between the Forest Service and the Oregon Department of Fish and Wildlife (ODFW). The Forest Service manages habitat while ODFW manages big game populations. The Magone project planning area is located within the Northside Big Game Management Unit, which is currently about 700 elk above management objective.

### *Effects to Rocky Mountain Elk*

**Alternative 1 (No Action) – Direct and Indirect Effects**

With no activities proposed, values utilized to evaluate habitat effectiveness for elk, such as cover percentages, quantity and quality of forage, and open road densities, would remain in their current condition in the short-term. Total percent, satisfactory and marginal cover would remain in excess of Malheur Forest Plan standards for the portions of the East Fork Beech Creek and Grub Creek subwatersheds in the project planning area. Cover and forage would remain well distributed.

In the mid- to long-term (with continued fire suppression), development of late and old structure (LOS) and/or multi-strata stands could create additional satisfactory and marginal cover stands. Long-term changes could increase cover over time, although with improved cover or potentially larger homogenous stands of cover, there could be less forage, which could conceivably reduce HEI values. In the mid- to long-term, forage would decrease as tree canopies close and shade the ground.

With no thinning or prescribed fire, increased tree stocking could increase the frequency and intensity of high-severity wildfire events. A fire of moderate to intense magnitude and severity could convert LOS or multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, therefore changing forage to cover ratios and distribution across the project planning area. With proportionate changes in ratios, HEI values would not be expected to fall below Malheur Forest Plan standards.

Open road densities would be maintained at current levels as described in the MIS – Big Game Existing Condition section. Open road densities meet Malheur Forest Plan standards (**Error! eference source not found.**). In summer and winter range, marginal, satisfactory, and total cover is in excess of Malheur Forest Plan standards. Where satisfactory and marginal cover provide hiding cover, the excess of total cover could mitigate the effects of elevated road density (based on HEI). This alternative would not result in direct effects to big game security. Implementation of this alternative would construct no new permanent roads or modify existing open road densities or road management. Relationships between the spatial distribution and disturbance associated with open roads and hiding cover habitat would also not change, as existing road densities and levels of use are expected to remain the same in the short-, mid-, and long-term.

Aspen stands would remain in their current condition in the short- to mid-term. Grazing and browsing of aspen stands could continue. Conifer encroachment into aspen groves would remain and continue to increase. The overstory of each stand could remain even aged and approach the end of their life cycle. Aspen would continue to decline and stands would slowly disappear over the mid to long-term. If riparian restoration treatments are not implemented, forage conditions would continue to decrease in quality in those identified areas.

Upland shrub enhancement (conifer removal) treatments would not occur under this alternative and mahogany/bitterbrush communities would continue to be encroached and could ultimately be lost in the long-term. These communities provide critical quality browse and hiding cover for big game species. Allowing these upland shrub areas to continue to be overtopped and diminished could result in a substantial loss of quality habitat for elk and mule deer.

No biking/hiking trails would be developed under this alternative and therefore disturbance to big game from human interaction would be expected to remain at current levels, which are relatively low outside of fall hunting seasons.

**Conclusion** – Elk habitat would remain the same in the short-term. In the mid- to long-term, forage would likely decrease as a result of increasing cover, and critical habitats such as upland shrub areas and aspen could be degraded and eventually lost. However, because of their high mobility, extensive distribution, and the ability of elk and other big game species to find and use a variety of suitable habitats, there would be no negative trend in viability on the Malheur National Forest for Rocky Mountain elk.

### Alternatives 2, 3, and 4 – Direct and Indirect Effects by Proposed Activity

Please refer to Table 11 to review the differences in treatments and intensity (i.e., acres or miles) of proposed treatments under each action alternative. The effect of each activity type is assumed to be the same across alternatives unless otherwise noted. Further, it is also assumed that as the intensity of the proposed treatments change, the level of expected effects discussed below would also change accordingly.

**Silviculture Treatments and Prescribed Burning** – Non-commercial thinning of small trees and understory removal would have the greatest impact on hiding cover in the short-term. Through variable density thinning, the potential negative effects of removing understory trees would be reduced in many areas by retaining unthinned patches of dense trees throughout the project planning area. Unthinned patches would comprise up to 10 to 25 percent of areas treated with the variable density prescription (see Silviculture Report for percent of project areas treated) and range from 1 to 10 acres in size depending on the location on the landscape and moisture gradient. Leave patches may be even larger if they connect through the unit. Untreated patches would remain at high risk to bark beetle attack and would likely not provide cover if tree mortality were high and these patches would likely be gradually lost over the next 25 years. Further, the designation of connectivity corridors and retention and expansion of the MA-13 old-growth network proposed in the project planning area would provide elk cover and permeability across the landscape. All action alternatives propose to expand the MA-13 old-growth network equally; however, an additional 2,326 acres would be designated in alternatives 2 and 4. Alternative 3 would have minimal acreage designated as connectivity.

Areas where thinning would occur would be expected to transition back into at least marginal cover in approximately 25 to 50 years depending on the residual stand density, species composition, and site quality following treatment. Many areas would be expected to recover to marginal or satisfactory cover much sooner than the 25 to 50 years because of accelerated growth rates and understory response.

Under alternatives 2 and 4, approximately 630 acres comprised of multiple stands were identified as areas of higher importance for elk security. These acres would be treated with commercial and non-commercial thinning; treatments were designed in conjunction with District wildlife staff specifically to meet the purpose and need of the project while providing optimum elk security. These acres would also be included in the approximate 6,200-acre connectivity corridors proposed under the same alternatives. Under alternative 3, these stands would not be left as dense and connectivity corridors would only comprise about 3,900 acres of the project planning area landscape.

The proposed activities would be conducted over a period of several years. At any one time, management activities would be localized in portions of the watersheds, and elk may or may not shift use areas as a result. Disturbance from logging operations and associated traffic from log haul cause animals to move to undisturbed security areas (i.e., non-treatment areas, corridors). In areas where topography is steep or ridges separate logging operations, big game movement is expected to be minimal. Edge (1982) reported elk moved 0.67 miles and Lieb (1981) found average displacement of 0.9 miles from logging operations in Montana. Under most circumstances, displacement of elk by human activities during logging is temporary. Some animals may return during night and weekends, when logging operations cease (Edge 1982). Elk and deer become habituated to logging in the non-hunting seasons due to the influx of quality food from lichens and moss on the felled trees. This has been commonly noted across the Blue Mountain Ranger District. Winter and late autumn logging benefits big game because food can be limiting during these seasons. Disturbance to big game is a concern in winter range. In big game winter range (MA-4a), timber management activities would be restricted where appropriate (see Appendix C – Project Design Criteria) to minimize disturbance to wintering deer and elk.

Analysis assumes that the greater the reduction in cover, the greater the increase in forage. Although, this may not necessarily be the case in the Cool Moist biophysical environments where woody understory recovery would be expected with little value as forage. Juxtaposition of cover and forage patches is also important, because big game use in openings decrease with increased distance from cover/forage edge areas as well as size and spacing of cover and forage patches.

Prescribed fires are expected to burn relatively cool, move slowly, and burn in a mosaic of burned and unburned patches to ensure a mosaic pattern of forage and cover are maintained. Individual burn blocks larger than 500 contiguous acres would require a wildlife biologist input to ensure that big game forage objectives are being met. Large, highly mobile animals like deer and elk tend to move calmly about the periphery of a fire (Smith 2000). Generally, small crews of about 5 to 10 people would manage the fire. However, if all-terrain vehicles with drip torches were used to traverse the area, deer and elk may move further out from the fire perimeter; and if a helicopter were used, deer and elk may move an even greater distance from the fire perimeter. Disturbance would be short-term, unlikely lasting more than 2 or 3 days on the larger burning operations. Elk and deer could return to burn areas as soon as the ground cools.

Direct fire-caused mortality of elk would be unlikely as mortality typically occurs only in uncontrolled wildfire where fire fronts are wide and fast moving, fires are actively crowning, and thick smoke occurs. Spring treatments would potentially affect calving (and fawning) habitat. However, to help mitigate effects to calves (and fawns) crews are to watch for lone elk or deer from May 1 to June 30. If crews see lone animals, they would search the immediate area for calves or fawns and avoid lighting where newborns are found.

Prescribed burning can reduce hiding cover when allowed to burn at moderate or high intensity in thickets of young understory. Understory tree mortality would vary considerably but rarely would burning reduce stocking of understory trees at the upper level. In areas where mechanical treatments preceded prescribed fire, hiding cover would likely be reduced to the point that prescribed fire would have minimal additional effects.

The negative impact of understory removal is compounded near roads where sight distance is increased, thereby raising the potential for poaching and harvest vulnerability of elk and deer. Burning might increase the possibility of insect activity, particularly bark beetle. If beetle activity intensifies, there would be some risk of additional losses of hiding cover.

Because prescribed fire would be expected to burn in a mosaic, ground vegetation would be reduced but not entirely eliminated. Temporarily, forage opportunities may be better elsewhere until ground vegetation is reestablished.

Burning would eventually improve forage conditions as more open canopies allow more light to reach the forest floor. Most native grasses and forbs and many shrubs respond positively to increased light and fire. Plants tend to sprout vigorously from their roots if the above ground portions are killed by fire. Fire can also increase nutrient content and palatability of forage, although the increased quantity of forage after a fire may be greater than the increased quality of that forage (Smith 2000). Species that respond favorably to fire include pinegrass, elk sedge, wild rose, snowberry, ceanothus, serviceberry, chokecherry, and currant.

**Roads Activities** – Road densities after implementation of alternative 2 would remain at or near current levels across the project planning area. Note that road densities produced in the habitat effectiveness index (HEI) model did not change from existing conditions when compared to proposed actions in alternatives 3 and 4. This is likely a result of road changes in those alternatives being so negligible (0.3 mile) that net change was not detected by the HEI model.

Within the first few years (approximately 2 to 10), temporary road construction and use would increase open road densities. During timber harvest, log haul activities would temporarily increase local traffic levels. Disturbances to big game would be expected to increase over the current condition. Elk are likely to shift use areas as activities progress across the watershed (USDA Forest Service 2006). After completion of timber harvest, specified haul roads would be closed. As road closures are completed, disturbances to deer and elk from vehicular traffic and mortality from hunting would be expected to decrease from current levels. However, the decrease in disturbances to deer and elk would only occur if road closures are effective. Closures would in part mitigate losses in hiding cover that occur due to timber harvest and prescribed fire. A wildlife biologist would review all road closures to determine effectiveness.

Seasonal restrictions in winter range would minimize effects from proposed activities during the most sensitive season. Disturbance is less of a concern to summer range where more of the land base is available for use.

**Aspen/Riparian Treatment and Protection** – Aspen stands throughout the project planning area are proposed for treatment (see Silviculture Report for details). Fencing would occur after treatment activities are completed in suitable areas to protect suckers from browsing by ungulates. Riparian treatments (see Aquatics Report and section) would open up areas in riparian corridors to promote deciduous species in areas with a high likelihood of success. Elk in the immediate area could be displaced during riparian/aspen treatment. During the first several years post-treatment, many of these trees would be essentially off limits to elk, but as new regeneration becomes established and protective fences deteriorate or are removed, available browse should increase. Aspen groves would be larger and healthier and more likely to remain a viable component of the landscape.

Enhancing deciduous shrubs/trees in applicable riparian areas could potentially increase forage for elk and deer in the short-term, and potentially provide additional vertical structure for cover.

**Recreation Opportunity Improvements** – Recreation opportunities would increase under any of the action alternatives (Table 11). However, the miles of new trail designation and new trail construction are significantly higher in alternatives 2 and 3. The total length of new trails would be 48.8 miles in alternative 2 and 92.4 miles in alternative 3. Only 11.9 miles of new trails are proposed in alternative 4.

Wisdom et al. (2005) found that mountain bikes caused flight responses (disturbance and displacement) in elk and mule deer. Disturbance to elk from bike riders was found to be slightly less than from ATV riders, but higher than from hikers or horseback riders. The distance and time that elk showed flight responses varied throughout the study. Depending on use timing and use levels (duration and number of users), disturbance to big game and other wildlife could be substantial under alternatives 2 and 3. Under alternative 2, the proposed trails would contain approximately 2.5 miles within the Nipple Butte Wildlife Emphasis Area, primarily along the fringes. Approximately 15 miles of trails would be constructed in the Nipple Butte Inventoried Roadless Area (IRA).

Currently the IRA, and the included WEA, provide quality areas of little disturbance to big game animals. Although the trail system proposed in alternative 2 is fairly extensive, it would leave large areas across the landscape for big game refuge.

Under alternative 3, there would be an extensive network of approximately 5 miles of trails within the WEA and approximately 28 miles of trails in the IRA. This, combined with existing levels of disturbance from roads, would likely result in a very little proportion of the landscape being suitable for big game security. During seasons of higher recreation use, the majority of the project planning area would be minimally suitable for big game, if not entirely avoided.

Trails proposed under alternative 4 would result in some levels of disturbance to big game from users; however, by only adding 11.9 miles of trail throughout the entire project planning area, any effects would be minor. This would include approximately 3 miles of trails in the IRA and none in the WEA.

Effects from increased trails in big game winter range would be expected under alternatives 2 and 3, which contain approximately 12 and 24 miles of trails, respectively, proposed through big game winter range. Some of these effects could be mitigated by project design criteria that would seasonally close the trails in big game winter range, and much of the project planning area would likely not be accessible to mountain bikers in the wintering months. In years of milder weather or when animals remain on winter range after closure dates, displacement would be expected. However, no protection could be guaranteed to fawning/calving animals that may be along the trails. This could lead to abortion or abandonment in isolated encounters depending on stage of pregnancy and age of newborn animals. These encounters would be expected to be very minimal and not the norm. However, as trail miles increase across alternatives, opportunity for these encounters would increase. In the short-term, alternative 3 could plausibly reduce calving and fawning success rates and overall population recruitment in the project planning area. This would only be expected in the short-term due to the habituation to and/or total avoidance of the trails and immediately adjacent areas.

In the mid- to long-term under alternative 4, individuals would likely become habituated to trail users and increased recreation along those trails. Big game would likely avoid areas immediately adjacent to trails proposed in alternative 2 rendering any available security patches increasingly valuable. Under alternative 2, adequate cover and security patches would be expected to remain in suitable patches and distribution to provide escape from increased recreation. Under alternative 3 in the mid- to long-term, proposed trails would likely change big game distribution in the project planning area to entirely avoid these trails and adjacent areas, and could conceivably increase big game densities and associated resource competition in adjacent subwatersheds. Although big game distribution would not be expected to completely avoid the entire project planning area, under alternative 3 many areas that are currently providing valuable cover and forage for big game would no longer be readily suitable or used. The trails proposed under alternative 3 could have an adverse effect to elk habitat and their use thereof in the project planning area.

### *Habitat Effectiveness Index*

Any of the action alternatives would maintain the overall habitat effectiveness for each subwatershed in summer and winter range at or above Malheur Forest Plan standards. Table 108 displays post-treatment habitat effectiveness index (HEI), cover, and open road densities.

See discussion above regarding how the proposed treatments under each alternative were compared to the existing condition and the subsequent changes in structural stages based on treatments. The HEI model runs are located in the project record for the Magone Project.

The primary effect from the action alternatives is the reduction in satisfactory and marginal cover and the change in cover/forage distribution. Following treatment, satisfactory cover and marginal cover would continue to exceed Malheur Forest Plan standards except in Grub Creek (both summer and winter range) and the Nipple Butte Wildlife Emphasis Area (WEA) under alternatives 2 and 3. Total cover would fall below Malheur Forest Plan standards in Grub Creek winter range under alternative 3, and throughout the WEA. However, total cover in the WEA would fall below standards by less than 1 percent under either alternative. This is likely due to the proposed extensive upland shrub enhancement treatments that would remove juniper and other conifer cover but still provide cover from mahogany and substantially increase forage. Outside of the WEA, cover distribution would likely be better than the model can predict due to the leave patches and design of the variable density thinning practice. This would leave numerous patches providing cover distribution. While satisfactory, marginal, and total cover, and size and spacing (distribution) is reduced in some areas, HEI values remain at or above Malheur Forest Plan standards. Further, HEI values (HEIcsfr) generally increase under each action alternative except for alternative 4 in the WEA, where HEI values decrease.

Following the completion of implementation of vegetation treatments proposed in alternatives 2 and 3 (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Most lost vertical cover would be recovered quickly and both forage and cover quality and quantity would be expected to increase substantially. Satisfactory cover would be expected to meet or exceed Malheur Forest Plan standards in Grub Creek and the WEA in the short- to mid-term as marginal cover moved to satisfactory and additional cover through regeneration and increased vigor would be added. Forage would increase under all alternatives.

The vegetation treatments proposed in alternative 4 would have similar beneficial effects to elk habitat, however not as evident compared to alternatives 2 and 3. The lack of upland shrub enhancement (conifer removal) treatments in the WEA is noticeable under alternative 4 as HEI values actually decrease. These treatments under alternatives 2 and 3 would be expected to improve big game habitat vastly on 3,865 acres in the IRA, the majority of which would occur in the WEA.

**Table 108. Habitat effectiveness index values, cover percentages, and open road densities for East Fork Beech Creek, Grub Creek, and Nipple Butte Wildlife Emphasis Area (WEA) by alternative.**

| Subwatershed | HEc | HEs | HEf | HEr | HEcsfr | %S | %M | % total cover | Open road density miles/mile$^2$ |
|---|---|---|---|---|---|---|---|---|---|
| **Summer Range** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.3* | *0.3* | *N/A* | *0.4* | *0.4* | *12* | *5* | *20* | *3.2 (1.5*)* |
| **East Fork Beech Creek** | | | | | | | | | |
| Alternative 1 (no action) | 0.82 | 0.55 | *N/A* | 0.54 | 0.59 | 51.9 | 28.3 | 80.3 | 1.48 |
| Alternative 2 (proposed action) | 0.72 | 0.76 | *N/A* | 0.55 | 0.62 | 20 | 25.9 | 45.9 | 1.42 |

| Subwatershed | HEc | HEs | HEf | HEr | HEcsfr | %S | %M | % total cover | Open road density miles/mile$^2$ |
|---|---|---|---|---|---|---|---|---|---|
| Alternative 3 | 0.72 | 0.73 | *N/A* | 0.54 | 0.61 | 15.9 | 20.3 | 36.2 | 1.48 |
| Alternative 4 | 0.86 | 0.61 | *N/A* | 0.54 | 0.61 | 47.3 | 19.3 | 66.5 | 1.48 |
| **Grub Creek** | | | | | | | | | |
| Alternative 1 (no action) | 0.71 | 0.66 | *N/A* | 0.41 | 0.55 | 31.8 | 45.5 | 77.4 | 2.82 |
| Alternative 2 (proposed action) | 0.62 | 0.7 | *N/A* | 0.41 | 0.55 | 10.1 | 30.4 | 40.4 | 2.82 |
| Alternative 3 | 0.62 | 0.65 | *N/A* | 0.41 | 0.53 | 8.2 | 27.4 | 35.6 | 2.82 |
| Alternative 4 | 0.77 | 0.66 | *N/A* | 0.41 | 0.57 | 29.7 | 25.4 | 55.2 | 2.82 |
| **Winter Range (MA-4a)** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.4* | *0.3* | *0.4* | *0.5* | *0.5* | *10* | *10* | *25* | *2.2(1.0*)* |
| **East Fork Beech Creek** | | | | | | | | | |
| Alternative 1 (no action) | 0.81 | 0.64 | 0.50 | 0.68 | 0.65 | 45.4 | 27.9 | 73.4 | 0.72 |
| Alternative 2 (proposed action) | 0.68 | 0.8 | 0.50 | 0.69 | 0.66 | 13.5 | 23.2 | 36.7 | 0.69 |
| Alternative 3 | 0.69 | 0.76 | *0.5* | 0.68 | 0.65 | 12.5 | 21 | 33.5 | 0.72 |
| Alternative 4 | 0.8 | 0.68 | *0.5* | 0.68 | 0.66 | 38.2 | 26.4 | 35.4 | 0.72 |
| **Grub Creek** | | | | | | | | | |
| Alternative 1 (no action) | 0.67 | 0.46 | 0.5 | 0.47 | 0.52 | 29.5 | 57.9 | 87.4 | 2.18 |
| Alternative 2 (proposed action) | 0.6 | 0.66 | *0.5* | 0.47 | 0.55 | 5.9 | 22.2 | 28 | 2.18 |
| Alternative 3 | 0.6 | 0.58 | *0.5* | 0.47 | 0.53 | 3.3 | 13.8 | 17.1 | 2.18 |
| Alternative 4 | 0.67 | 0.66 | *0.5* | 0.47 | 0.57 | 20.7 | 41.6 | 62.2 | 2.18 |
| **Nipple Butte WEA (MA-21)** | | | | | | | | | |
| *Malheur Forest Plan Standard* | *0.5* | *0.6* | *0.5* | *0.6* | *0.5* | *20* | *20* | *40* | *1.5* |
| Alt. 1 (No action) | 0.83 | 0.69 | 0.5 | 0.97 | 0.73 | 46.8 | 23.8 | 70.6 | 0.05 |
| Alt. 2 (Proposed) | 0.71 | 0.84 | *0.5* | 0.97 | 0.73 | 16.5 | 23 | 39.5 | 0.05 |
| Alt. 3 | 0.71 | 0.84 | *0.5* | 0.97 | 0.73 | 16.6 | 22.7 | 39.3 | 0.05 |
| Alt. 4 | 0.8 | 0.66 | *0.5* | 0.97 | 0.71 | 42.8 | 29.2 | 72 | 0.05 |

*Desired open road density based on Malheur Forest Plan Record of Decision
HEc = habitat effectiveness derived from the quality of cover
HEs = habitat effectiveness derived from the size and spacing of cover
HEf = habitat effectiveness derived from the quantity and quality of forage; HEf is not used in summer range.
HEr = habitat effectiveness derived from the density of roads open to vehicular traffic
%S = Satisfactory Cover, %M = Marginal Cover, % Total Cover = %S + %M
N/A – Not Applicable. HEf is not used for summer range.

**Conclusion for Elk Habitat and Habitat Effectiveness Index Analysis** – The results of the HEI analysis for alternative 2 (proposed action) (Table 108) shows the interaction between the four variables (HEs, HEr, HEf, HEc) maintains the HEI value resulting from the proposed activities above Malheur Forest Plan standards under each alternative. However, alternatives 2 and 3 generally increase HEI values with the exception of summer range in the Grub Creek subwatershed. Overall, with achievement of expected results of treatments in the mid- to long-term, it is expected that all action alternatives would improve elk habitat according to HEI in the project planning area. However, alternative 2 would most improve elk habitat throughout the project planning area due to higher residual cover values as opposed to alternative 3, increasing forage, and including the upland shrub enhancement treatments throughout the IRA and WEA. Any negative or adverse impacts would be short-term, and ultimately result in a beneficial impact to elk habitat and therefore elk populations.

**Cumulative Effects to Elk**

All of the activities listed in Table 13 and Table 14 were considered when determining potential cumulative effects on big game habitat. The cumulative effects analysis focuses on past, ongoing, and foreseeable future activities that may contribute to impacts on big game utilizing the area.

The following discussion focuses on those past, ongoing, and foreseeable future activities that may contribute positive or negative effects. Past activities such as grazing, timber harvest, road construction associated with timber harvest, wildfire, fire suppression, and firewood cutting have impacted the quantity, quality, and distribution of cover and forage across the analysis area. These activities have created the existing condition of elk habitat and baseline conditions for HEI.

Past timber harvest activities in the analysis area have affected elk habitat by decreasing hiding cover and increasing forage and understory development. Road construction associated with timber increased accessibility of the area to firewood cutting and hunting, and increasing pressure and disturbance to elk. Conversely, following the years of heavy timber harvest on the Malheur National Forest, many subsequent years of fire suppression has rendered much of the project planning area outside of HRV and has likely created higher cover values, and therefore higher HEI values than would be expected historically. But, forage values would have likely been higher under HRV.

Present actions include thinning and burning activities under the County Road 18 Healthy Forest Restoration Act Project. The 18 Road Project includes 1,200 acres of commercial thinning, 1,600 acres of non-commercial thinning, and prescribed burning to create strategic fuel breaks adjacent to County Road 18. The Magone Project would cumulatively add to the effects of the reduction in cover from implementation of the 18 Road Project. The 18 Road Project borders the eastern portion of the Grub Creek subwatershed portion of the Magone project planning area, which would be below Malheur Forest Plan standards in summer and winter range with the implementation of alternatives 2 or 3. However, connectivity corridors established during the design of the 18 Road Project were aligned with proposed connectivity corridors in the Magone Project, providing elk and other wildlife secure travel corridors through expansive areas with reduced cover. Retaining these connectivity corridors in a high quality condition would be paramount for landscape permeability.

Other reasonably foreseeable future projects authorized under the Malheur National Forest Aquatics Restoration Decision (Table 14) could have some additive effects to the proposed project. Particularly, riparian enhancement thinning where large and coarse woody debris would be tipped and added into streams could create very small openings in the riparian areas where forage would be expected to increase. Typically, forage associated with riparian areas is of higher quality than upland forage during hotter, drier times. Riparian shrub enhancement and planting would likely create additional elk forage as well, although some areas would be fenced and not readily available. Any riparian enhancement projects would be beneficial or of negligible effect to elk.

The development of at least 10 springs into water troughs for livestock would likely have negligible effects to elk, but may provide more reliable and readily available surface water (at the trough) during hotter, drier times and would be beneficial to elk.

Other projects similar to the proposed Magone Project are currently in implementation stages across the Malheur National Forest, including Galena, Damon, Soda Bear, and Starr on the Blue Mountain Ranger District.

Firewood cutting and fire suppression are ongoing.

Cumulative impacts to big game habitat related to alternative 2 (proposed action) could include a decrease in habitat effectiveness resulting from changes in cover and forage (HEI values); and increased human disturbance and access to critical calving/rearing areas, and increased hunting pressure in the short-term.

Reduction in cover in the Grub Creek subwatershed and WEA would cumulatively add to the reduction of cover from other large-scale projects being implemented on Forest Service lands within close proximity, such as the 18 Road and Galena projects. However, with appropriate project design criteria, treatment prescriptions, connectivity corridors, and best management practices, the combined effects from current and future timber projects would be expected to maintain overall HEI at the Forest-level within Malheur Forest Plan standards.

Fire activity within close proximity to the Magone project planning area is described in the Historical Conditions section of the Silviculture and Fire, Fuels, and Air Quality reports and sections. These post-fire areas are currently providing increased forage to elk and other big game species in and around the project planning area. Big game animals would continue to benefit from the effects of these fires in the short- to mid-term.

The action alternatives are expected to increase available forage for domestic and wild ungulates through commercial and non-commercial thinning and fire. Forage would be increased substantially across the landscape under alternatives 2 and 3 (higher reduction in cover). This would cumulatively increase forage on the larger landscape when combined with other landscape restoration projects in the area. Competition from ungulate diets for the domestic and wild species studied appear most similar in late summer, when forage biomass and quality declines with summer drought, suggesting increased potential for competition. Livestock grazing may reduce available forage for big game species, but with the increase in forage availability for both wild and domestic ungulates there are no detrimental cumulative impacts from grazing.

Although hiking trails are sparse and bike trails are essentially non-existent across the Blue Mountain Ranger District, the additional miles of trails under alternative 2 and particularly alternative 3 would substantially add to the current 7-mile trail system. The cumulative effects of adding these trails to the current trail system would have negative effects on elk through routine disturbance and displacement, and to overall elk distribution; however, those effects would be expected to stay mostly within the Magone project planning area.

**Conclusion for Elk** – Although each action alternative would likely enhance elk habitat, alternative 3 would have the most detrimental effects to elk because of the smaller proportion of landscape proposed for connectivity, and the extensive recreation trails and associated effects. Trails proposed under alternative 2 could also have notable effects on elk distribution but would still provide areas of quality security.

The Northside Game Management Unit, which contains all of the Magone project planning area, is approximately 700 elk over the management objective of 2,000 elk. Adjacent Desolation and Murderer's Creek Game Management Units are also above management objectives. Therefore, although alternative 3 would have the highest level of effects to elk and big game, there would not be a viability concern for the species on the Blue Mountain Ranger District or Malheur National Forest under any action alternative.

### 3.9.4.4 Old Growth Network

The Malheur Forest Plan identifies three management indicator species for old growth (primarily old forest multi strata structured stands): pileated woodpecker, pine marten, and three-toed woodpecker (Table 109). In addition, the white-headed woodpecker is a good indicator of the health of old forest single stratum habitat. By providing old growth habitat for these species, it is assumed that habitat for other old growth obligate species would be provided for as well.

**Table 109. Old growth management indicator species**

| Management indicator species | Representing | Habitat requirements | Habitat present in analysis area |
|---|---|---|---|
| Pine marten (*Martes americana*) | Old growth | Mature, mesic coniferous forests, with high structural diversity in the understory | Limited due to large proportion of open, dry forest. |
| Pileated woodpecker (*Dryocopus pileatus*) | Old growth, primary cavity nester, snags and down wood | Extensive areas of dense coniferous forests with tall closed canopy, high basal area and large diameter snags | Yes |
| Three-toed woodpecker (*Picoides tridactylus*) | Old growth, primary cavity nester, snags and down wood | Higher elevation (above 4,500 feet) lodgepole pine and mixed conifer forests with a lodgepole component | Limited due to lack of montane mixed conifer and lodgepole habitat. |
| White-headed woodpecker (*Picoides albolarvatus*) | Old growth, primary cavity nester, snags and down wood | Open ponderosa pine forests with large trees and snags in large patches | Yes |

To provide for pileated woodpecker and pine marten habitat viability, the Malheur Forest Plan Management Area 13 (MA-13) provides for the management of old growth habitat through a system of dedicated old growth (DOG) areas and replacement old growth (ROG) areas. DOGs were delineated forest-wide to provide an even distribution of habitat; one DOG for roughly every 12,000 acres, or approximately 5 miles apart. ROGs are established to counter possible catastrophic damage or deterioration. Although replacement areas may not have all the characteristics of old growth, they are managed to achieve old-forest structure over time. Thus, when a DOG no longer meets the needed habitat requirements, the associated ROG has already been established to replace it. To ensure species viability for three-toed woodpeckers, Malheur Forest Plan Standard 59 gives direction to identify potential or existing old growth lodgepole pine forests. There are currently no old-growth lodgepole pine forests in the Magone project planning area.

The Malheur Forest Plan directs that pileated woodpecker areas be comprised of 600 acres, composed of a 300-acre DOG (reproductive area) and a 300-acre pileated woodpecker feeding area (PWFA). In addition, the Malheur Forest Plan and its corresponding Final Environmental Impact Statement identify requirements and guidelines for identifying ROGs and PWFAs for each DOG. ROGs are intended to be half the size of DOGs (i.e., 150 acres for replacement of pileated woodpecker DOGs). In addition, ROGs may overlap with feeding areas. Pine marten units are to be 240 total acres, composed of a 160-acre DOG and an 80-acre ROG. Again, ROGs are intended to represent replacement units and only need to be half the size of their corresponding DOG. DOGs managed for both species should be managed at least at the 600-acre minimum recommended size for pileated woodpeckers. Management requirements are derived from the U.S. Forest Service (1986) Minimum Management Requirements.

The Malheur Forest Plan directs continued review of DOG and ROG acreages, with adjustments to boundaries as appropriate, to ensure that suitable levels of old-growth habitat are provided for species dependent upon them and to ensure that those areas meet Malheur Forest Plan standards and guidelines. MA-13 direction permits exchanging the status of DOGs and ROGs in the event a DOG is destroyed by wildfire or is otherwise no longer providing old growth habitat.

MA-13s are typically adjusted during development of a project’s proposed action(s).

All or part of eight (8) MA-13 areas are located within the Magone project planning area. However, three of these DOGs are located along the project boundary with few acres actually within the Magone project planning area. Table 110 describes existing acreages and minimum Malheur Forest Plan requirements for DOGs, ROGs, and PWFAs for acres within and outside of the project planning area.

Most of the designated DOGs provide highly suitable habitat for pileated woodpeckers and occupancy has been documented in those DOGs. However, intensive remote camera surveys for pine marten were conducted in many of the DOGs and other suitable old-forest habitat and pine marten occurrence was not documented. Even within pine marten DOGs and modeled pine marten habitat, most habitat is marginal and adequate connectivity to more suitable and occupied habitat does not currently exist.

DOG and ROG acreages, Malheur Forest Plan requirements, and species management designations for DOGs and ROGs within the Magone project planning area are described in Table 110.

**Table 110. Old Growth Management Area 13 – Malheur Forest Plan minimum requirements and existing acreages**

| Old Growth Management Areas – existing condition | Minimum MA-13 acre requirements | Existing acres (in project planning area) |
|---|---|---|
| DOG 03318 (318) Pileated/Pine Marten (PP)[1]<br>Replacement Area | 160<br>80 | 410 (5.8)<br>0 |
| DOG 03259 (259) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 293 (285)<br>0 |
| DOG 03259 (259) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 167 (5.3)<br>0 |
| DOG 03260 (260) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 159 (7)<br>0 |
| DOG 03515 (515) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 434 (all)<br>0 |
| DOG 03114 (114) Pileated Woodpecker (PW)<br>Feeding Area (PPFA)<br>Replacement Area (PPRO) | 300<br>300<br>150 | 341 (322)<br>0<br>0 |
| DOG 03115 (115) Pileated Woodpecker (PW)<br>Feeding Area (PWFA)<br>Replacement Area | 300<br>300<br>150 | 327 (326)<br>0<br>0 |
| DOG 03119 (119) Pileated Woodpecker (PW)<br>Feeding Area (PWFA)<br>Replacement Area | 300<br>300<br>150 | 403 (all)<br>0<br>0 |
| **TOTALS IN MAGONE PROJECT:** | **DOGs**<br>**ROGs**<br>**PWFAs**<br>**ROG/PWFA** | **1,788**<br>**0**<br>**0**<br>**0** |

### *Late and Old Structure*

Regional Forester's Eastside Forest Plan Amendment 2 (1995) amended the Malheur Forest Plan to manage late and old structure (LOS) stands within the historical range of variability, including areas inside and outside of the DOG/ROG network. There are approximately 8,856 acres of LOS in the Magone project planning area, roughly 33 percent of the project planning area, with approximately 89 percent of that being old forest multi strata and 11 percent in old forest single stratum. Late and old structure within the project planning area provides suitable habitat for pileated woodpeckers; however, most LOS stands (including MA-13 areas) are not currently providing ideal or adequately connected habitat for pine marten. Pine marten presence in LOS could not be determined in the project planning area.

Interior Columbia Basin habitat evaluations for white-headed woodpeckers—a species that shows a strong preference for mature, single-stratum ponderosa pine dominated habitats—indicated that roughly 70 percent of the watersheds in the Blue Mountains showed a decreasing trend in the preferred habitat type, with a 30 percent static and/or increasing trend (Wisdom et al. 2000). Results from the evaluation also indicated declines in large trees (≥20 inches DBH) and open canopied forest types (<40 percent crown closure) in the dry biophysical environment.

Habitats for species closely associated with these mature open-canopied forest types, such as white-headed woodpecker, pygmy nuthatch, and western bluebird, have likely declined across the landscape from historical levels. Although the Magone project planning area only has approximately 856 acres of old forest single stratum in the upland portions of the project planning area, these species have been documented throughout the old forest single stratum habitat as well as old forest multi strata and younger forests. White-headed woodpeckers were commonly encountered during field reconnaissance and surveys of the Magone project planning area.

### *Effects to Old Growth and Late and Old Structure (LOS) Network*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under alternative 1, there would be no changes to the MA-13 network. No ROGs would be designated, no LOS stands would be treated, and no connectivity corridors would be designated. Malheur Forest Plan standards regarding the MA-13 network would not be met. No change from the existing condition would be expected.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

All action alternatives propose to alter the location and/or stand boundaries of dedicated old growth (DOG) areas in order to expand the current MA-13 network to include replacement old growth (ROG) and pileated woodpecker feeding areas (PWFAs) to meet Malheur Forest Plan standards (Table 111). Ultimately, there would be a net loss of approximately 312 acres of dedicated old growth, but an overall expansion of approximately 1,067 acres of the MA-13 network including DOGs and ROGs/PWFAs. The following descriptions provide an explanation of the proposed changes to the MA-13 network under all action alternatives.

**Explanation of Proposed Old Growth Changes**

*DOG 03115PW* – This DOG would be relocated to more suitable old-growth habitat for pileated woodpeckers. Further, a 455-acre ROG/PWFA would also be designated adjacent to the new DOG boundary. The 326 acres where the DOG is currently designated does not exhibit old-growth characteristics and would be treated in alternatives 2 and 3 to promote increased growth and resiliency for desired species, and to move the stand towards LOS forest. Under alternative 4, location and boundary proposals would be consistent; however, no treatment would take place. This stand also contains many mistletoe-infested trees that would be deferred from harvest to retain important habitat for blue grouse and other wildlife species. This stand would be re-designated as ROG for DOG03114PW.

*DOG 03114PW* – There would be no change in the original DOG acres or boundary for this stand. The currently designated DOG03115PW would be designated as ROG/PWFA for this DOG. An additional 61 acres would be added to this ROG/PWFA for a total of a 327-acre ROG/PWFA.

*DOG03119PW* – Three-hundred (300) acres of the existing 403 acres would remain designated as DOG03119PW. The remaining 103 acres, combined with additional adjacent 204 acres would be designated as ROG/PWFA. The splitting of this DOG and adding additional acres to the ROG would be specifically for the purpose of expanding the MA-13 network and meeting Malheur Forest Plan standards.

*DOG03515MM* – No boundary or location alterations would be proposed. However, the existing 434-acre DOG would be split to include a 237-acre DOG and a 197-acre ROG to meet Malheur Forest Plan standards.

*DOG03259* – There would be no change in existing DOG location or size. An additional 87-acre ROG would be designated for this stand.

### *Connectivity Corridors*

Connectivity corridors were designed during project planning and are proposed under each action alternative to serve as connectivity between late and old structure (LOS) stands to allow for movement of old growth species and big game. The goal of creating "connectivity" is to manage stands in corridors at higher canopy densities when compared to more intensively managed stands located outside of corridors. Corridors established for old growth species in the project planning area would allow for big game migratory and dispersal movements, as well as providing higher cover rates and forage. Magone connectivity corridors would link LOS stands, including dedicated old growth (DOG), replacement old growth (ROG), and associated old growth areas to LOS areas throughout the project planning area, including those within the Nipple Butte Inventoried Roadless Area (IRA) and Nipple Butte Wildlife Emphasis Area. The Nipple Butte Wildlife Emphasis Area is entirely with the IRA. The designated connectivity corridor is approximately 9,066 acres in alternatives 2 and 4, and about 6,740 acres in alternative 3 (approximately 34 and 25 percent of the project planning area, respectively), including proposed acreages from DOGs, ROGs, pileated woodpecker feeding areas (PWFAs) and areas that would be treated but left denser specifically for connectivity and big game security. Not including the MA-13 areas, the proposed connectivity would be approximately 6,218 acres in alternatives 2 and 4, and approximately 3,892 acres in alternative 3.

**Table 111. Old Growth Management Area 13 – minimum requirements, existing and proposed acres after adjusting boundaries for the proposed action**

| Old Growth Management Areas – existing condition | Minimum MA-13 acre requirements | Existing acres in project planning area | Adjusted Acreages | Comments |
|---|---|---|---|---|
| DOG 03318 (318) Pine Marten/Pileated (PP)<br>Feeding Area<br>Replacement Area | 300<br>300<br>150 | 5.8<br>0<br>0 | 5.8<br>0<br>0 | Most of DOG is outside project planning area and will be adjusted in future projects. |
| DOG 03259 (259) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 285<br>0 | 285<br>86 | Designated 86 acres for ROG, no change to DOG acres. The detached piece of DOG 259 is currently 167 acres but only 5.3 are in the project areas. |
| DOG 03260 (260) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 7 | 7 | Most of DOG is outside project planning area and will be adjusted in future projects. |
| DOG 03515 (515) Pine Marten (MM)<br>Replacement Area | 160<br>80 | 434<br>0 | 237<br>197 | Original 434 acres were divided into 237 acre DOG and 197 acre ROG. |
| DOG 03114 (114) Pileated Woodpecker (PW)<br>Feeding Area (PWFA)<br>Replacement Area | 300<br>300<br>150<br>NA | 322<br>0<br>0 | 322<br>327*<br>327 | No change in original DOG acres. DOG 03115 was re-designated as ROG/PWFA for DOG 03114 with an additional 61 acres. New ROG (existing DOG 115) would be treated under Alternatives 2 and 3. All 327 acres of the PWFA was also designated as ROG, therefore all of the required 150 acre ROG overlaps. |
| DOG 03115 (115) Pileated Woodpecker<br>Feeding Area (PWFA)<br>Replacement Area | 300<br>300<br>150 | 326<br>0<br>0 | 314<br>455*<br>455 | Moved DOG 115PW to more desirable location and added 455 acres ad PWFA/ROG. All 455 acres were designated as ROG and would include the PWFA. |
| DOG 03119 (119) Pileated Woodpecker (PW)<br>Feeding Area (PWFA)<br>Replacement Area | 300<br>300<br>150 | 403<br>0<br>0 | 300<br>307*<br>307 | 300 acres of existing DOG would be used as new DOG. The remaining 103 acres would be designated as ROG with an additional 204 acres as ROG. |
| **TOTALS:** | **DOGs**<br>**ROGs**<br>**PWFAs** | **1,788**<br>**0**<br>**0** | **1,476**<br>**1,372**<br>**1,089*** | |
| | | **1,781** | ***2,848** | |

*PWFAs are not added to the total estimated acreages because all additional acres were designated as ROG and assumes to include PWFAs.

DOG = dedicated old growth; ROG = replacement old growth; PWFA = pileated woodpecker feeding areas.

### 3.9.4.5 Old-Growth Dependent Species

*Existing Condition of Pileated Woodpecker*

Pileated woodpecker is a management indicator species for both dead and defective wood habitat and old growth habitats and is considered a keystone habitat modifier in the Pacific Northwest.

Pileated woodpeckers prefer late successional stages of coniferous or deciduous forest, but also use younger forests that have scattered, large, dead trees (Bull and Jackson 1995, Bull et al. 2007). In northeastern Oregon, these large woodpeckers tend to select unlogged stands of old-growth grand fir with closed canopies and, in some cases, open stands with high densities of large snags and logs (Bull and Holthausen 1993, Bull et al. 2007). They are rarely found in stands of pure ponderosa pine (Bull and Holthausen 1993). Because they nest in large-diameter snags, roost in large-diameter hollow trees, and use large logs and snags for foraging, pileated woodpeckers are associated primarily with late and old structure stands (Bull et al. 2007). Approximately 80 percent of pileated woodpecker foraging in northeastern Oregon occurs in dead trees and dead and downed logs.

Pileated woodpecker nest cavities are quite large, with a mean diameter of 8 inches (21 centimeters) and cavity depth of 22 inches (57 centimeters). In eastern Oregon, nest trees are predominantly ponderosa pine, with a smaller proportion in western larch (Bull 1987). Roosts are typically found in live and dead grand fir with a mean DBH of 28 inches (Bull et al. 1993). Timber harvest has had a negative effect on habitat for this woodpecker (Bull 2003, Bull et al. 2007). Removal of live and dead large-diameter trees, downed woody material, and canopy eliminates nest and roost sites, foraging habitat, and protective cover. In addition, prescribed fire may eliminate or reduce the number of snags, logs, and cover (Bull 2003).

Wildlife use data from DecAID was used in conjunction with snag estimates to determine acres of potential habitat for forest types across the Forest. DecAID values for existing condition on the Malheur National Forest, as they relate to pileated woodpecker habitat requirements, are displayed in the Management Indicator Species section under Dead and Defective Habitat (Figure 54 through Figure 57; Table 105 and Table 106). Snag habitat is likely to be a limiting factor for pileated woodpeckers in the eastside mixed-conifer habitat type throughout the Magone project planning area.

However, due to an increase in dense, multi-canopy stands caused by fire suppression, structural conditions used by pileated woodpeckers have increased on drier ponderosa pine sites and habitat for pileated woodpeckers is increasing across the Blue Mountains (Wisdom et al. 2000). However, this habitat type does not produce large-diameter snags (>21 inches DBH) in densities used by pileated woodpeckers (Figure 54 and Table 105 and densities of large-diameter snags have declined from historical to current levels (Korol et al. 2002, Wisdom et al. 2000).

Currently there are 148,508 acres of source habitat for pileated woodpecker on the Malheur National Forest. Acreages for the Magone project planning area are estimated at 3,223 acres, or about 2 percent of the habitat on the Forest. The project planning area contains substantial pileated woodpecker habitat and pileated woodpeckers have been documented throughout the project planning area, including habitat within dedicated old-growth areas.

Pileated woodpeckers are considered vulnerable in the state by Oregon Department of Fish and Wildlife (http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_taxon.pdf). However, they are considered “apparently secure” in Oregon by NatureServe (http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Dryocopus+pileatus).

### *Effects to Pileated Woodpecker*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities are proposed; animals would not be displaced, harassed, or injured by the project. Habitat would remain as described in the existing condition section.

Due to an increase in dense, multi-canopy stands due to fire suppression, habitat for pileated woodpeckers is increasing across the Blue Mountains (Wisdom et al. 2000). However, densities of large-diameter snags (>21 inches DBH) have declined from historical to current levels (Korol et al. 2002, Wisdom et al. 2000). These trends would continue into the future under the no action alternative.

With the no action alternative there is an elevated risk of insect activity as well as higher severity wildfire. Mortality to large pine from insect activity could result in snags for pileated woodpecker nesting habitat. However, depending on extent and severity, insect activity or wildfire effects would possibly set back the structural stage development, resulting in areas of young trees and longer time spans to develop old forest structures. Smaller fires of lower intensity could create snag habitat for pileated woodpeckers. Larger more intense fire events would reduce suitable pileated woodpecker habitat.

In the ponderosa pine/Douglas-fir wildlife habitat type (PPDF – WHT) the landscape is near or above reference conditions for snag densities of both large (>20 inches DBH) and small (>10 inches DBH) snags. However, large snag habitat for pileated woodpecker is generally rare in this WHT both currently and within historic reference conditions.

In the eastside mixed-conifer wildlife habitat type (EMC- WHT) the landscape is deficit in snag density classes above 2 snags per acre for large (>20 inches DBH) snags, as compared to reference conditions. The snag density classes in this WHT are below the 30 percent tolerance level for pileated woodpecker. Large snag habitat for pileated woodpecker species may be limiting in this WHT. Woodpeckers may be limited to the more productive sites in this WHT, where snag densities are expected to be higher (Bull et al. 2007, Ohmann and Waddell 2002).

**Conclusion** – Alternative 1 would not affect pileated woodpecker habitat and therefore would not contribute to a negative trend in viability on the Malheur National Forest for this species.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Table 11 displays the differences in intensity (i.e., acres or miles) of proposed treatments under each alternative. It is assumed that as the intensity of the proposed treatments change, the level of expected effects discussed below would also change accordingly.

Refer to the Silviculture Report and section for a more detailed description of expected future vegetation conditions. In the 25-year modeling period, vegetation structure would move toward alignment with the historical range of variability (HRV) for old forest single stratum (OFSS) under all action alternatives. Vegetation structure would move towards HRV for old forest multi strata (OFMS) in alternatives 2 and 3. Alternative 4 would further depart OFMS from HRV. Under the 40-year modeling scenario, all action alternatives would result in attaining HRV in OFSS, however all action alternatives would result in OFMS exceeding HRV. Therefore, alternatives 2 and 3 could reduce pileated woodpecker habitat in the short-term.

The reduction of habitat (outside the MA-13 network) would result from commercial and non-commercial thinning activities. Prescribed burning could have varying effects on habitat suitability as well. Commercial treatment and some levels of non-commercial treatment would reduce the suitability of some stands for nesting and foraging immediately after treatment. With time, canopy closure would be expected to recover to some extent, as the retained trees expand their crowns in diameter and depth in response to the release from competition that results from the thinning. Non-commercial and commercial thinning where old trees are deferred would help to promote the development of larger trees in the stand. Thus, these treatments could facilitate the development of higher quality foraging and nesting habitat in the long-term. However, foraging habitat in primarily grand fir stands may be slightly reduced because thinning would select against grand fir species, which is a desirable forage species for pileated woodpeckers.

Prescribed burning may reduce habitat suitability by reducing down wood and canopy closure, and by altering the timing of mortality in grand fir and Douglas-fir. Fire is likely to result in an increase of fire-killed fir trees soon after the treatment, providing a flush of foraging substrate, but later within stand mortality is expected to decline and thus foraging opportunities. The level of impact to suitability for pileated woodpeckers with this treatment is dependent on fuel loading and burn conditions initially, as well as the frequency of maintenance burning. It is assumed that across the majority of the proposed prescribed fire areas forested stands are expected to retain sufficient tree densities.

Within the MA-13 network, only the existing DOG03115PW (proposed to become ROG for 03114PW) would be treated with commercial and non-commercial harvest. This treatment would likely reduce stand structure enough to make it unsuitable for pileated woodpecker nesting in the short-term; however, the area would continue to serve as an ideal foraging area. Each action alternative proposes an approximate 1,067-acre expansion of the MA-13 network as well as an extensive connectivity corridor (6,218 acres in alternatives 2 and 4 and 3,892 acres in alternative 3). The MA-13 network and proposed connectivity corridors would continue to provide nesting and foraging habitat at existing levels. Activities within designated connectivity corridors would be designed to manage stands within the top third of site potential so that stand structure would not be lost. These areas would also be expected to continue to provide suitable nesting habitat for pileated woodpeckers.

Further, approximately 10,000 acres (approximately 37 percent) of the project planning area is within the Nipple Butte Inventoried Roadless Area (IRA). Habitat within the IRA is currently providing suitable nesting and foraging habitat (most of timbered portions and riparian habitat conservation areas) would continue to provide habitat at current levels.

For analysis of the expected effects of proposed activities to dead and defective habitat, see the Management Indicator Species section of this report under Dead and Defective Habitat.

**Conclusion for Pileated Woodpecker** – In the 25-year modeling period, vegetation structure would move toward alignment with HRV for old forest single stratum (OFSS) under all action alternatives. Vegetation structure would move towards HRV for old forest multi strata (OFMS) in alternatives 2 and 3. Alternative 4 would further depart OFMS from HRV. Under the 40-year modeling scenario, all action alternatives would result in attaining HRV in OFSS; however, all action alternatives would result in OFMS exceeding HRV. Therefore, alternatives 2 and 3 could reduce existing pileated woodpecker habitat in the short-term (short-term decrease in OFMS). However, with OFMS expected to increase and exceed HRV under each alternative in the long-term, habitat for pileated woodpecker would be expected to increase eventually.

The expansion of the MA-13 network and designation of extensive connectivity corridors would retain large portions of the project planning area in their existing condition. Most of these areas currently provide suitable nesting and/or foraging habitat for pileated woodpeckers, and would be expected to continue to do so.

Further, this project would impact less than 2 percent of suitable habitat across the Forest.

Due to the expected shifts in forest structure, expansion of the MA-13 network, extensive connectivity, and treatment of a fraction of forest-wide habitat, the overall direct and indirect effects could result in a small negative trend of habitat in the short- to mid-term (short-term decrease in existing OFMS). Any loss or shift of habitat would be negligible at the scale of the Forest. However, OFMS habitat would remain within or above HRV in the short- and long-term under each action alternative. Therefore, population viability for pileated woodpecker is expected on the Malheur National Forest under each action alternative.

### *Existing Condition White-Headed Woodpecker*

Information regarding white-headed woodpeckers and associated expected effects are discussed in the Proposed, Endangered, Threatened, and Sensitive Species section of this document.

### *Existing Condition Pine Marten*

Pine marten is a management indicator species for old-growth habitats. Below is a summary of pine marten ecology important to providing information pertinent to assessing the impacts of the project on this species. For additional detail see Mellen-McLean (2012b) and the body of work led by Evelyn Bull (Bull 2000, Bull and Blumton 1999, Bull et al. 2005, Bull and Heater 2000, 2001a, and 2001b).

Pine marten are associated with old multi- and single-story, and unmanaged young multi-story structural stages in subalpine and montane forests. Large snags and down logs provide rest and den sites for marten (Wisdom et al. 2000).

In the Blue Mountains, marten selected unharvested, closed canopy (50 to 75 percent), old-structure stands in subalpine fir and spruce forests (Bull et al. 2005). Stands used by martens had higher densities of large snags (>20 inches DBH), averaging 4.0 snags per acre. Snags used as resting and denning sites average from 26 to 38 inches DBH in eastern Oregon, depending on habitat type (Bull and Heater 2000, Raphael and Jones 1997).

In addition to providing rest and den sites, down wood is an important component of marten habitat because the primary prey of martens is small mammals associated with down wood. These small mammals include voles (*Microtus* sp.), red-backed voles (*Clethrionomys gapperi*), snowshoe hares (*Lepus americanus*), and squirrels in northeast Oregon (Bull and Blumton 1999, Bull 2000). Subnivean (under snow) spaces created by logs provide marten with access to prey during the winter (Bull and Blumton 1999). Down wood used as rest and den sites in the Blue Mountains averaged 26 inches DBH (Bull and Heater 2000).

Because of an increase in dense, multi-canopy stands due to fire suppression, habitat for pine marten is increasing across the Blue Mountains (Wisdom et al. 2000). However, densities of large-diameter snags (>21 inches DBH) have declined from historical to current levels (Korol et al. 2002, Wisdom et al. 2000).

As discussed in the Management Indicator Species section under Dead and Defective Habitat, densities of large snags (>20 inches DBH) in the eastside mixed-conifer wildlife habitat type (EMC WHT) are well below reference conditions in the snag density classes that provide habitat for pine marten (Figure 56; snag density classes 2–4 and 4–6). Snag habitat is likely to be a limiting factor for marten in the EMC WHT. It is not expected that any areas in the ponderosa pine/Douglas-fir WHT are currently providing suitable habitat for pine marten.

Down wood is not likely to be limiting for pine marten across the Forest. Large wood used by marten are near reference conditions in the EMC WHT. Downed wood is also near or above historical conditions in the Beech Creek watershed that comprises about 85 percent of the Magone project planning area (Figure 59 and Figure 60).

Pine marten are considered vulnerable in the Blue Mountains by Oregon Department of Fish and Wildlife (http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_taxon.pdf); however, they are also a hunted species. They are considered "vulnerable" to "apparently secure" in Oregon by NatureServe (http://www.natureserve.org/explorer/servlet/NatureServe). Reduction in amount of late-seral forest and associated large snags and logs, and associated fragmentation of habitat are the main reasons marten are considered vulnerable (Hargis et al. 1999, Wisdom et al. 2000).

Habitat models developed by Mellen-McLean (2012b) estimate marten source habitat on the Malheur National Forest to be 18,248 acres, with 9,704 acres of secondary habitat (USDA Forest Service 2014c, as corrected by Blue Mountain Ranger District wildlife staff). Approximately 4 percent of the available primary habitat on the Forest, roughly 720 acres, is within the Magone project planning area. In addition, approximately 643 acres (about 6.5 percent Forest-wide) of secondary habitat exists within the Magone project planning area. Due to current population viability concerns, it is important to retain or manage appropriate stands towards primary habitat conditions and retain currently primary habitat. No treatments are proposed for suitable pine marten source habitat in the Magone project planning area. However, after ground truthing the model, some habitat that was modeled as source primary lacked the desirable structure and/or opportunity for adequate connectivity to other or better habitat. These areas were considered for management actions as they did not have the characteristics of suitable marten habitat.

Despite intensive survey efforts through deployment of remote camera traps, no marten were documented and therefore presence could not be confirmed in the project planning area.

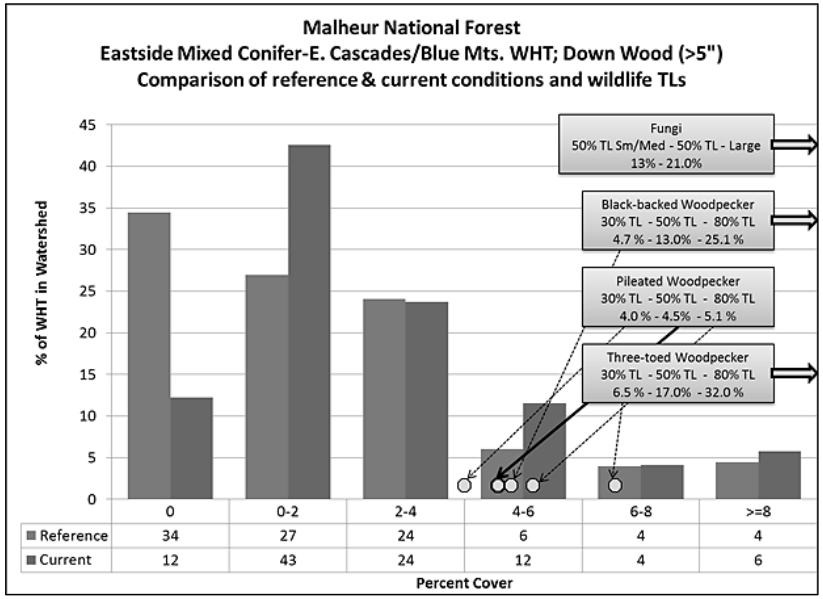


**Figure 59. Comparison of reference condition to current condition for down wood in the eastside mixed-conifer wildlife habitat type portion of the Malheur National Forest; down wood >5 inches DBH; 50% tolerance levels for wildlife species. Reference condition derived from DecAID unharvested vegetation plots in the Blue Mountains (see analysis file); wildlife tolerance levels from tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

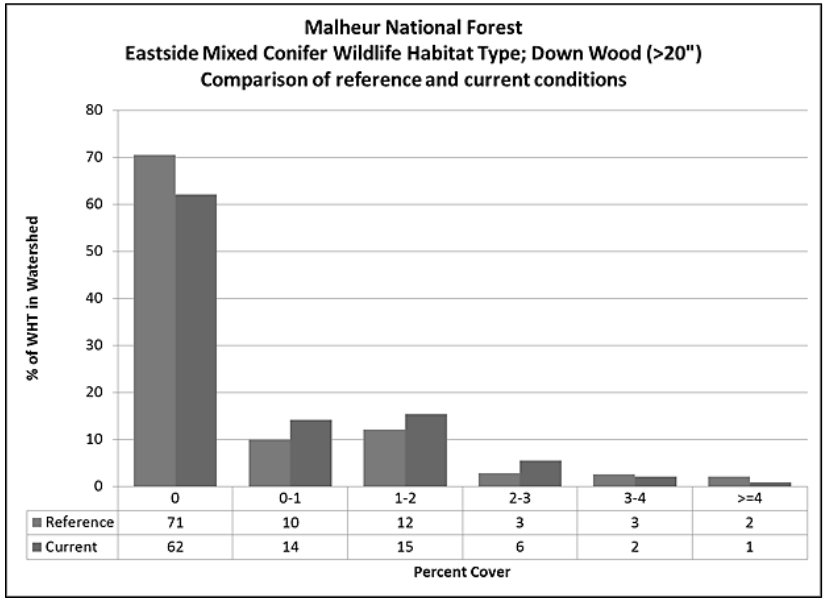


**Figure 60. Comparison of reference condition to current condition for down wood in the eastside mixed-conifer wildlife habitat type portion of the Malheur National Forest; down wood >20 inches DBH; 50% tolerance levels for wildlife species. Reference condition derived from DecAID unharvested vegetation plots in the Blue Mountains (see analysis file); wildlife tolerance levels from tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

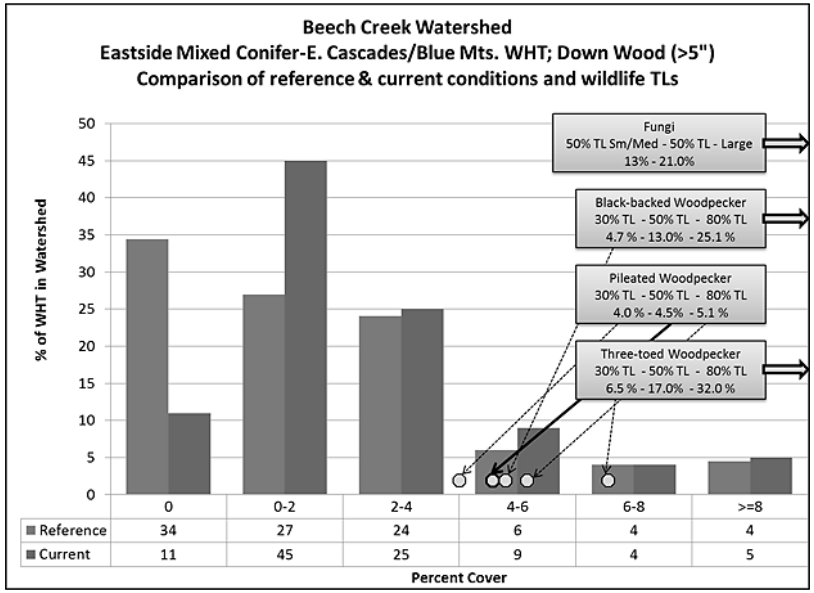


**Figure 61. Comparison of reference condition to current condition for down wood the eastside mixed-conifer wildlife habitat type portion of the Magone analysis area; down wood >5 inches DBH; 50% tolerance levels for wildlife species. Reference condition derived from DecAID unharvested vegetation plots in the Blue Mountains (see analysis file); wildlife tolerance levels from tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

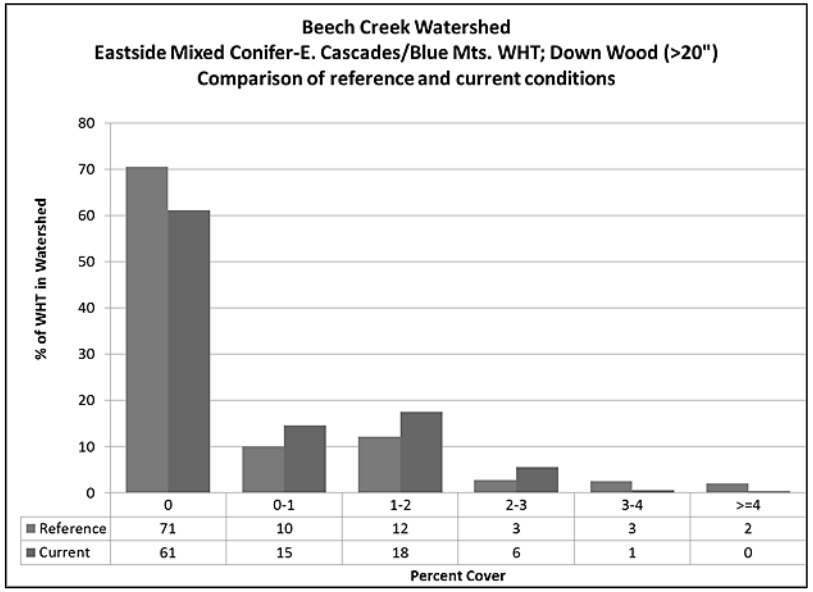


**Figure 62. Comparison of reference condition to current condition for down wood the eastside mixed-conifer wildlife habitat type portion of the Magone analysis area; down wood >20 inches DBH; 50% tolerance levels for wildlife species. Reference condition derived from DecAID unharvested vegetation plots in the Blue Mountains (see analysis file); wildlife tolerance levels from tables EMC_S/L.sp-22 and EMC_PF.sp-22 (Mellen-McLean et al. 2012).**

**Table 112. Tolerance levels for wildlife occurring in the eastside mixed-conifer wildlife habitat type**

| Species | Down wood percentage cover 30%, 50%, and 80% tolerance levels |
|---|---|
| Black-backed woodpecker | 4.7, 13.0, 25.1 |
| Three-toed woodpecker | 6.5, 17.0, 32.0 |
| Pileated woodpecker | 4.0, 4.5, 5.1 |

Source: DecAID Tables EMC_S.sp-22 and EMC_L.sp-22.

### *Effects to Pine Marten*

#### No Action (Alternative 1) – Direct and Indirect Effects

In this alternative, no silviculture treatments, road activities, fuels reduction, trail construction, or prescribed burning would occur within the project planning area. There would be no direct effects to pine marten; animals would not be displaced, harassed, or injured by the project. Habitat would remain as described in the existing condition section.

In the absence of disturbance, stands would further develop old-growth characteristics and move towards climax conifer species. In the long-term, some stands could potentially lose canopy cover as some larger trees would die and become snags. Insect activity as well as fire hazard would remain elevated in the project planning area.

Disturbances due to wildfire or insects could have beneficial or detrimental effects for pine marten habitat, depending on the plant community affected, and the severity or extent of such events. Large-scale events outside of the historical range of variability may result in loss of cover and the overall gap in snag recruitment or large down wood over extensive areas could be detrimental in the long-term, since replacement trees that ultimately provide future snags or large down wood could take decades to develop.

**Conclusion** – Alternative 1 would not affect pine marten habitat and therefore would not contribute to a negative trend in viability on the Malheur National Forest.

#### Alternative 2, 3, and 4 – Direct and Indirect Effects

Table 11 displays the differences in intensity (i.e., acres treated or miles proposed) of proposed treatments under each alternative. It is assumed that as the intensity of the proposed treatments change, the level of expected effects discussed below would also change accordingly.

Due to the concerns for marten viability on the Forest, no management activities under any action alternative would occur within the modeled primary marten habitat except in 84 acres comprised of 5 stands. Three of those stands (about 50 acres) are isolated stands that lack the desired structure for marten and any opportunities for connectivity to other suitable marten habitat, and the remaining 34 acres are strategic fuel break treatments along roads—which would likely not provide suitable marten habitat. These proposed acres are consistent across all action alternatives.

Many stands determined to be modeled source habitat are either associated with riparian areas, or are located in the northern part of the project planning area, primarily in the inventoried roadless area and would not be treated under any action alternative. Primary habitat is old forest stands with high canopy closure within Cool Moist or Cold Dry plant association groups.

Other than the 84 acres of modeled habitat determined to not be suitable for marten or in strategic fuel break areas, there would be no direct effects to pine marten source habitat. In these 84 acres, habitat would not likely be suitable for martens post-treatment. However, these acres are not currently suitable and are not expected to be occupied by pine marten in their existing condition.

Secondary habitat consists of smaller diameter tree size (15 to 20 inches DBH) in similar plant associations. Modeled secondary habitat would not be excluded from treatment under any action alternative. Retention of higher basal areas of grand fir or western larch, high canopy closure, and retention of large snags, hollow trees, or large down logs would be key.

Commercial and non-commercial thinning in higher density (secondary) habitats would result in impacts to the density of ground level vegetation and its effectiveness as cover for pine marten. Denser understory development is important to the security of the species from predation, as well as its ability to successfully hunt and find prey (Ruggiero et al. 1994).

While dead wood habitats would remain relatively unchanged in secondary habitat, and continue to provide habitats for marten, the loss of vegetation cover may be enough to limit or prevent use of treated habitats in the short- to mid-term. Treatments were designed to move stands towards older age classes and more aligned with HRV, which could be beneficial to pine marten in the long-term without repeated entries for thinning activities.

Prescribed underburning can alter or remove vertical and horizontal stand structure including snags and down wood. Studies by Hardy and Reinhardt (1998) document both loss of existing snags during prescribed burning and recruitment of new snags through fire caused mortality. The level of loss and the replacement is dependent on fire intensity, time of year, local weather conditions, and fuel load. Generally, smaller diameter trees would be killed by fire resulting in the recruitment of small diameter snags. Large diameter snags could be consumed by fire depending on the time of year burned and the fuel moisture content. Underburning could result in a loss of down wood, and reduce prey availability and subnivean access (Bull and Blumton 1999).

The entire project planning area is included for potential planned ignition areas under alternatives 2 and 3. Alternative 4 would not permit planned ignitions in the Nipple Butte Inventoried Roadless Area (IRA) and alternative 3 would confine planned ignitions in the IRA to fall only. Alternative 2 would permit planned ignitions throughout the project planning area in spring or fall.

Spring burning would not be expected to significantly affect pine marten habitat, as fuel moisture is generally higher resulting in minimal loss of the critical down wood component of marten habitat. Further, project design criteria would require coordination with District wildlife staff prior to any planned ignitions near MA-13 areas or primary marten habitat to eliminate or minimize effects to this habitat.

Fall burning would be expected to have more substantial impacts to marten habitat. With fuel moisture generally lower in the fall and the inherent density of dead and down wood that constitutes primary marten habitat (ladder fuels), fall burning could consume a larger amount of downed wood resulting in unsuitable habitat for pine marten. The majority of pine marten primary habitat and MA-13 network designated for pine marten are within the inventoried roadless area and in the northern portions of the project planning area (proposed prescribed burn units 6 and 7).

Ignition in these areas would be limited to fall only under alternative 3 and is not proposed in alternative 4. Alternative 4 would only permit managing unplanned ignitions in units 6 and 7. Depending on the size and intensity of fall burns, alternative 3 could remove a significant amount of suitable marten habitat in the project planning area.

Alternative 4 would offer the highest levels of protection of pine marten habitat. However, project design criteria would require coordination with District wildlife staff prior to ignition and would eliminate or mitigate any expected effects from controlled prescribed fire regardless of alternative.

The proposed biking/hiking trails under alternatives 2 and 3 would dissect some MA-13 areas as well as primary source habitat for pine marten. This could result in increased predation potential as areas along the proposed trails became more open and direct disturbance and displacement of individuals along those trails. Although the distance affected is unknown, depending on levels of recreation some areas immediately adjacent to these trails could become entirely unsuitable for pine marten due to routine disturbance and displacement. Although alternative 2 only proposes 14.8 miles of trails through the IRA as opposed to the 28.2 miles in alternative 3, effects are expected to be similar. Effects would be somewhat reduced in alternative 2 compared to alternative 3 as the proposed trails primarily stay on the outer edges of the IRA and along ridgetops. Alternative 3 proposes trails throughout the IRA that would cross MA-13 areas and primary habitat with higher frequency than alternative 2. The 11.9 miles of new trail proposed under alternative 4 would include approximately 3 miles of trails in the IRA, but due to location would not be expected to have substantial effects to pine marten individuals or habitat. Refer to the Management Indicator Species section of this document under Dead and Defective Habitat for the expected effects to snags from the proposed trail systems. Loss of snags and downed wood ultimately would remove these critical components of marten habitat and render habitat within the area of effect unsuitable for pine marten and could potentially fragment large blocks of currently suitable habitat in the long-term. However, these effects cannot be quantified, as the levels of recreation and use of these trails are impossible to predict.

The Forest's network of dedicated old growth (DOG) and replacement old growth (ROG), combined with the proposed expansion under the action alternatives in the Magone project planning area, would continue to be managed to maintain or develop, and retain habitat for pine marten and pileated woodpecker.

Aspen and riparian restoration would enhance habitat diversity and benefit prey species of pine marten. In the long-term, improved cover within riparian areas would increase overhead security for pine marten.

**Conclusion for Pine Marten** – Although alternatives 2 and 3 could have considerable effects to pine marten individuals and habitat from the proposed trail systems, potential prescribed fall burning and silvicultural treatments in secondary habitat, continued viability of the pine marten is expected on the Malheur National Forest under all action alternatives for the following reasons:

- Timber management activities would avoid primary source marten habitat except for 84 acres that are not currently providing suitable pine marten habitat. This would retain approximately 4 percent of primary habitat Forest-wide.
- Secondary habitat in the project planning area only equates to about 6.5 percent of secondary habitat Forest-wide and treatments would manage these stands towards older age class stands and the HRV.

- MA-13 expansion and extensive connectivity corridors would result in approximately 9,066 acres in alternatives 2 and 4, and approximately 6,740 acres in alternative 3 that would retain and connect LOS habitat, including primary source habitat for pine marten. Even with intermittent trail interruptions, this would provide, retain and connect adequate habitat for pine marten denning, foraging and dispersal.
- Current down wood levels are near or above the HRV in all size and density classes.
- Project design criteria would minimize the loss of snags and down wood from project activities.
- Although adequate habitat exists and intensive surveys occurred throughout this habitat, no pine martens were documented. Although absence cannot be assumed, densities are expected to currently be very low throughout the project planning area.

### *Existing Condition Three-Toed Woodpecker*

Three-toed woodpeckers are a management indicator species for both dead and defective wood habitat and old-growth lodgepole pine habitats. The three-toed woodpecker prefers stands where lodgepole pine is either dominant or co-dominant, and mostly uses trees 9 inches DBH and greater for both nesting and foraging (Bull et al. 1980, Goggans et al. 1988). Suitable habitat is tied to existing levels of diseased and decaying trees with heart rot for nesting and roosting, as well as decaying substrate to provide a prey base for wood-boring insects (Goggans et al. 1988). In particular, three-toed woodpeckers are attracted to areas with high concentrations of bark beetles, such as habitats created by stand replacing burns or blowdown. Three-toed woodpeckers are associated with locally abundant insect outbreaks, and their populations are irruptive as they follow beetle outbreaks across the landscape.

A habitat relationship model developed for the three-toed woodpecker in Oregon indicates that that the presence of recently dead trees killed by mountain pine beetle was the best predictor of presence of the woodpecker, with a contribution to the model of 47.5 percent (Chapman 2011). Quadratic mean diameter of the dominant conifer, lodgepole pine basal area, and density of snags greater than10 inches DBH all contributed about equally to the model (18.5, 15.4, and 14.6 percent, respectively).

Three-toed woodpeckers are considered vulnerable in the state by Oregon Department of Fish and Wildlife and NatureServe. They are considered vulnerable primarily due to the following threats and risks: salvage of dead trees, fire suppression, and decline in old forests of lodgepole, subalpine fir, and Engelmann spruce (Wisdom et al. 2000). However, habitat for this woodpecker, and associated species has been increasing in the Blue Mountains (Wisdom et al. 2000).

Snags provide nesting, roosting, and foraging habitat for three-toed woodpeckers. They use smaller snags than many other woodpecker species, ranging from about 11 to 15 inches DBH. Snags used are recently dead trees of a wide variety of conifer species. (Mellen-McLean et al. 2013).

There are 33,401 acres of active beetle infested forest in lodgepole and high-elevation mixed conifer stands on the Malheur National Forest. Estimates of current forest conditions susceptible to future insect infestations and/or stand-replacing fire gives an indication of how much potential habitat is available for the three-toed woodpecker on the Forest. An analysis of current vegetation in closed-canopy forests of small, medium, and large tree structure classes indicate 42,601 acres currently exist on the Forest in the vegetation types used by the woodpeckers (FSVEG Spatial Data Analyzer imputed dataset, May 2014 version).

Based on analysis of current conditions, mid- and late-seral forests that provide potential habitat are well below the historical range of variability (HRV) across the Malheur National Forest and in Cold Dry forests (Figure 63). These forests are susceptible to stand-replacing fire and insect outbreaks and thus are likely to provide some primary habitat in the future; however, the amount of these forests is currently too low to provide an adequate, continual supply of habitat for the three-toed woodpecker.

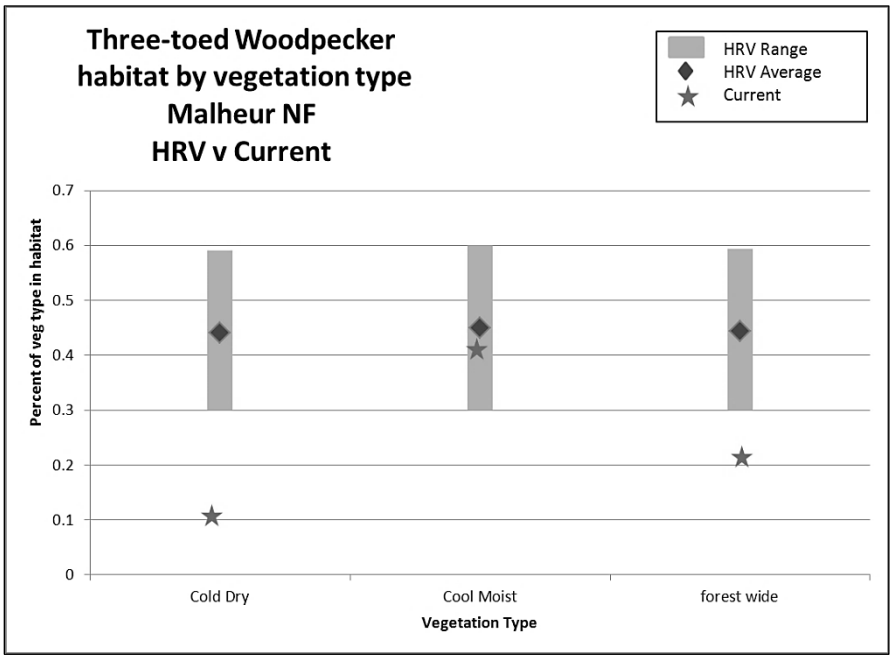


**Figure 63. Amount of three-toed woodpecker habitat across the Malheur National Forest by potential vegetation type compared to the historical range of variability (HRV). Secondary habitat is considered closed canopy stages of mid- and late-seral forested stands (Wales 2011).**

Estimates of available potential habitat compared to HRV estimates were derived using vegetation and HRV data from the Blue Mountains Forest Plan Revision (Wales et al. 2011).

Approximately 117,600 acres of recent post-fire habitat (post 2005) occurs on the Malheur National Forest. Within and adjacent to the Magone project planning area there is no suitable post-fire habitat. However, large sections adjacent to the project planning area have experienced insect outbreaks, including mountain pine beetle.

Snags are also critical habitat components for the three-toed woodpecker. They are associated with areas of high snag density that result from beetle kill or other disturbances. Currently, the lodgepole pine and moist mixed-conifer wildlife habitat types (WHTs) are limited within the project planning area and on the landscape. Snag habitat within these WHTs was not analyzed because the analysis area and surrounding watersheds did not meet the minimum acre requirement for sound DecAID analysis.

In the eastside mixed-conifer WHT, densities of snags greater than 10 inches DBH are well below reference condition for snag density classes above 6 snags per acre (Figure 57). Due to lack of recent fire within the analysis area, there are not adequate amounts of habitat with high snag densities in this WHT.

### *Effects to Three-Toed Woodpecker*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed for the Magone Project would occur. There would be no direct, indirect, or cumulative effects to three-toed woodpecker or its habitat as a result of management activities.

Tree mortality in some lodgepole pine stands, as well as grand fir and other plant association groups within the project planning area, is occurring from insects and disease that is exacerbated by high stand densities. Most of this mortality is occurring in the size class less than 20 inches, although some larger trees are also being affected. Under the no action alternative, this trend would continue and mortality would likely increase into the future.

Disturbances due to wildfire or insects could have beneficial or detrimental effects for woodpecker habitat, depending on the plant community affected and the severity or extent of such events.

Smaller scale disturbances similar to historical fire events or insect outbreaks would benefit most primary cavity nesters dependent on snags and down wood. Large-scale events outside the historical range of variability would benefit some species in the short- to mid-term, but the overall gap in snag recruitment or large down wood over extensive areas could be detrimental in the long-term, since replacement trees that ultimately provide future snags could take decades to develop.

Fires of various size and intensity occur annually on the Malheur National Forest, providing some new post-fire habitat every year. This trend is expected to continue under the no action alternative.

**Conclusion** – Alternative 1 would not affect three-toed woodpecker habitat and therefore would not contribute to a negative trend in viability on the Malheur National Forest.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

A variety of treatments are proposed under each action alternative, including commercial and non-commercial thinning and prescribed fire, with the intent to reduce susceptibility to fire and insect and disease activity by reducing stand density and moving species composition more toward the ecologically desired mix (i.e., ponderosa pine and western larch) in Warm Dry forest types.

Thinning would occur in three-toed woodpecker secondary habitat within the Cold Dry forest type and Cool Moist habitat (see Silviculture Report and section for percentages), although no thinning would occur in designated old growth in either forest type. Cool Moist/Cold Dry lodgepole pine habitat currently below HRV would be treated in the Magone project planning area, but the expanded MA-13 complex and extensive wildlife corridors would help mitigate the potential effects. However, only approximately 2 percent of the forest-wide secondary habitat for three-toed woodpeckers exists in the Magone project planning area, primarily in the Beech Creek subwatershed.

Proposed treatment prescriptions in Cool Moist habitat were designed to mimic historical, mixed-severity fire conditions with the goal of creating more resilient, healthier Cool Moist habitats. Further, the Malheur National Forest is within HRV for Cool Moist three-toed woodpecker habitat.

In the short-term, three-toed woodpecker habitat would be expected to decrease in the project planning area; however, sustainable Cool Moist/Cold Dry lodgepole pine habitat would help ensure habitat retention in the long-term.

Both action alternatives propose aspen stand enhancement and riparian restoration. However, these activities would have negligible benefits to the three-toed woodpecker.

Because of the small amount of secondary habitat, small amounts of Cool Moist habitat and Cold Dry lodgepole habitat, the location of suitable secondary habitat, and the expansion of the MA-13 network and designation of extensive connectivity corridors under all action alternatives, it is not expected the Magone Project would result in any viability concerns to three-toed woodpeckers.

### *Cumulative Effects to Old Growth and Old Growth Dependent Species*

The area considered for cumulative effects is the Beech Creek watershed. All of the activities in Table 13 and Table 14 have been considered for their cumulative effects on old growth, connectivity habitat and associated species. The following discussion focuses on those past, ongoing, and foreseeable future activities that may contribute positive or negative effects. Past activities such as timber harvest, road construction, fire suppression, and wildfire have combined to create the current old growth condition in the analysis area. The historical range of variability (HRV) of forest vegetation in the Magone project planning area reflects the effects of past activities on structural stage.

Continued livestock grazing and active mining would not reduce old growth habitat, important snag habitat, down wood, or decrease connectivity for old growth dependent species. As a result, there is not likely to be a cumulative effect under any alternative on old growth dependent species from continued livestock grazing and active mining.

Although alternatives 2 and 3 would reduce old forest multi strata (OFMS) throughout the project planning area in the short-term, OFMS would not be altered within the proposed MA-13 network. In dry forest types, stands would be managed towards old forest single stratum (OFSS) structural stage (where HRV indicates). There would not be a loss of old growth habitat as a result of any action alternative, although structural stages could change. The action alternatives would retain old growth habitat and expand and manage a system of DOGs, ROGs, and PWFAs. There would be a net loss of 312 acres of dedicated old growth, but an expansion of 1,067 acres in the MA-13 network. Those 312 acres of dedicated old growth would not be lost from the network, only reclassified as replacement old growth. Furthermore, old growth habitats would be connected by extensive connectivity corridors under each alternative, ensuring the landscape would not be fragmented (other than intermittent disruptions from recreation trails) as a result of management activities.

Proposed projects may require new and temporary road construction, road decommissioning, and road closures. During harvest operations, it is expected that habitat would be lost through the felling of snags that pose a hazard to workers and equipment, not only within units but along haul routes as well. New road construction would allow access to snags, which could be removed as firewood, reducing habitat for pileated woodpeckers, martens, white-headed woodpeckers, three toed woodpeckers, and other species that use dead wood habitats. Effects resulting from the proposed activities would be mitigated by effective road closures after implementation of an action alternative and project design criteria for snag retention.

Changes in dead wood habitats as a result of the Magone Project could be detrimental to old growth habitat under alternatives 2 and 3, particularly with fall burning. Alternative 2 would provide more opportunity to design and time prescribed fire to have minimal effects to old growth habitat. Fragmentation of old growth habitat as a result of trail construction could be significant under alternatives 2 and 3, depending on the levels and timing of use.

In the short-term, the action alternatives would not contribute to cumulative losses of old growth habitat because late and old structure (LOS) stands would not be treated except to enhance old-growth attributes. In the long-term, the action alternatives would contribute positively to cumulative effects by accelerating the development of OFSS, retaining OFMS within or above HRV, and maintaining connectivity habitat between LOS. Therefore, proposed activities combined with MA-13 expansion proposed in other projects forest-wide would contribute positively toward the viability of species that use these habitats. There would be no adverse cumulative effects to pileated woodpeckers, pine martens, three-toed woodpeckers, or white-headed woodpeckers or their habitat within the MA-13 network from alternatives 2 or 4. Alternative 3 could result in significant cumulative loss and fragmentation of pine marten habitat from potential fall burning and higher recreation use levels along proposed mountain bike trails. However, as discussed in the pine marten section above, it is not expected that alternatives 2 or 4 proposed for the Magone Project would significantly affect pine marten population viability at the Forest-scale. There would be positive effects to white-headed woodpeckers from OFSS development.

**Cumulative Effects Specific to Pileated Woodpecker**

Past timber harvest projects were generally very intensive; focusing upon the removal of the larger, more valuable ponderosa pine, Douglas-fir, and western larch trees (green tree replacements). Past activities were done with disregard to habitat fragmentation, leaving a sufficient amount of old growth habitat for wildlife, or maintaining connectivity between LOS habitats. The majority of timber harvest and prescribed fire activities in the Magone Project would be conducted in the dry forest types where much of the vegetation is outside the HRV.

Much of the past fuels reduction and timber sale projects occurred within pileated woodpecker habitat. Proposed thinning and fuels treatments are additive to other similar projects in the larger cumulative effects area.

Together with other landscape objectives that limit or discourage large fires and insect outbreaks, the Magone Project would help protect existing old growth habitat from these disturbances. However, these same treatments would contribute to a negative trend in dead and defective wood habitat across the Forest. These treatments, added to the needs for hazard tree falling along roads and trails either from new projects or ongoing/existing projects, would alter or remove potential pileated woodpecker nesting, roosting, and foraging snags.

While additive cumulative effects may be anticipated, projects are consistent with Malheur Forest Plan objectives because the project is consistent with the standards and guidelines relating to pileated woodpecker (USDA Forest Service 1990a, Forest-wide Standard 1, page V-30) and habitat would remain above the HRV within the project planning area.

**Cumulative Effects Specific to Pine Marten**

Past timber harvest targeted and removed many of the largest diameter trees reducing old forest structure. Within mixed-conifer stands, even large diameter grand fir, important resting and denning habitat for pine marten, were often removed and piled in cull decks to be disposed of by burning or chipping. Large green replacement trees removed during this period reduced future snag potential and subsequent large snag densities throughout the project planning area. Past harvest activities that included overstory removal, shelterwood, and regeneration harvest, reduced the quantity and quality of connectivity between LOS and DOG/ROG habitat in some areas. Restoration prescriptions (thinning) under each action alternative for the Magone Project would add to cumulative impacts from past timber harvest and fuels reduction projects.

Together with other landscape objectives that limit or discourage large fires and insect outbreaks, the Magone Project would help protect existing old growth habitat from these disturbances. However, these same treatments would contribute to a negative trend in dead wood, an important component of marten habitat, across the Forest. These treatments, added to the needs for hazard tree falling along roads and trails either from new projects or ongoing/existing projects, would alter this component of marten habitat, particularly in alternative 3 and to a lesser extent alternative 2.

Fire suppression allowed shade-tolerant tree species to increase, shifting many stands to denser, multi-story structure. Fire suppression also removes snags as hazards. Prescribed fire would open some stands, removing some of the smaller ingrowth. Low intensity prescribed fire would be expected to burn in a mosaic, creating a diversity of habitat at various scales. Small patches of mortality could provide snags or create down wood from fallen trees, important habitat features for pine marten and their associated prey species. Higher severity fall burning in marten habitat could reduce suitable habitat significantly in the short- to mid-term if high levels of dead and down wood are consumed.

Roads and potentially trails create openings and fragment blocks of contiguous forest habitat. Vehicle and recreationist traffic, and the resulting disturbance, reduce security for some species. Roads also provide access for firewood cutting. Public firewood cutting is expected to continue along open roads and could have an additive negative effect on snag retention. Based on the proposed Malheur National Forest Access Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off road vehicle travel, with the exception of accessing dispersed campsites from open roads. Proposed road decommissioning and closure activities for the Magone Project, combined with the foreseeable changes in travel management would have a beneficial cumulative effect on snag retention, by reducing access for firewood cutting. However, high levels of recreation along with the extensive trails system proposed in alternatives 2 and 3 would be expected to cumulatively add to snag loss through hazard tree felling, and could conceivably cumulatively add to fragmentation of old-growth and LOS habitat.

While additive cumulative effects may be anticipated, suitable primary habitat would not be altered for pine marten. Because this project planning area only contains approximately 4 percent of suitable primary habitat across the Forest, the overall direct, indirect, and cumulative effects will result in a small negative trend of modeled habitat. The loss of habitat would be insignificant at the scale of the Forest. However, the expansion of MA-13 and extensive connectivity proposed would cumulatively add to old growth and LOS habitat that would develop and retain more suitable pine marten habitat.

**Cumulative Effects Specific to Three-Toed Woodpeckers**

Much of the past fuels reduction and timber sale projects occurred within three-toed woodpecker habitat. Most projects had similar objectives and thus likely made those areas less susceptible to wildfire as well as insects and disease. Therefore, proposed thinning and fuels treatments are additive to other similar projects in the larger cumulative effects area.

Together with other landscape objectives that limit or discourage large beetle outbreaks, the project would contribute to a small negative trend in three-toed woodpecker habitat (<2 percent reduction in habitat) across the Forest.

The extensive road network in the analysis area (largely a result of past harvest) has impacted snag densities by decreasing habitat from road construction and increasing accessibility of the area to firewood cutting. Public firewood cutting is expected to continue along open roads. Based on the proposed Malheur National Forest Access Travel Management Plan, it is foreseeable that cross-country travel would be restricted for off road vehicle travel, with the exception of accessing dispersed campsites from open roads. Proposed road decommissioning and closure activities for the Magone Project under each action alternative, combined with the foreseeable changes in travel management would have a beneficial cumulative effect on snag retention, by reducing access for firewood cutting, thus increasing dead and defective wood habitat used by the three-toed woodpecker.

Because this project impacts less than 2 percent of suitable habitat across the Forest, the overall direct, indirect, and cumulative effects would result in a small negative trend of habitat. The loss of habitat would be insignificant at the scale of the Forest. While additive cumulative effects may be anticipated, continued viability of the three-toed woodpecker is expected on the Malheur National Forest because conditions would be more in line with the HRV.

## 3.9.5 Featured Species

Featured species are identified in the Malheur Forest Plan as species that require special protections. The Malheur Forest Plan (USDA Forest Service 1990a, pages IV–30 and IV-31) provides direction (Forest-wide standards 50–55) for the protection of habitat for these species. Table 113 lists the seven (7) featured species currently on the Malheur National Forest. The table also includes their habitat requirements and whether habitat exists in the project planning area. Only species with habitat in the project planning area are discussed in detail. Sage grouse and upland sandpiper are also listed as Forest Service sensitive species, although there is no suitable habitat for either species in the Magone project planning area.

**Table 113. Featured species of the Malheur National Forest – habitat requirements and presence within the Magone project planning area**

| Featured species | Habitat requirements | Habitat present in project planning area |
|---|---|---|
| Northern goshawk (*Accipiter gentilis*) | A mosaic of mature, mixed conifer stands, with closed canopies and interspersed openings suitable of supporting a wide array of prey. | Yes, one (1) designated goshawk territory. Additional habitat present in project planning area. |
| Blue (Dusky) grouse (*Dendragapus obscurus*) | Coniferous forests (Douglas-fir, grand fir, subalpine fir) with a mixture of deciduous trees and shrubs near edges and openings with clumps of mistletoe infected Douglas-fir on ridge tops or upper slopes of ridges. | Yes |
| Sage grouse (*Centrocercus urophasianus*) | Open sagebrush plains ranging from 4,000-9,000 feet elevation. | No |
| Osprey (*Pandion haliaetus*) | Large, old growth trees with dead tops or large snags suitable for nesting (30 inches DBH and >60 feet high) adjacent to large rivers or lakes. | Yes, suspected foraging habitat along East Fork Beech Creek and Magone Lake |
| Pronghorn antelope (*Antilocapra americana*) | Open grasslands with low sagebrush as an important component. | No |
| California bighorn sheep (*Ovis canadensis*) | Alpine-desert grasslands associated with mountains, cliffs, foothills, and river canyons. | No |
| Upland sandpiper (*Bartramia longicauda*) | Native prairie grasslands and montane meadows. | No |

### 3.9.5.1 Northern Goshawk

#### *Existing Condition for Northern Goshawk*

In 1995 the Regional Forester's Eastside Forest Plan Amendment 2 (Eastside Screens) amended the Malheur Forest Plan. This amendment included interim management guidelines for northern goshawk in regards to timber harvest. The northern goshawk is a raptor and the Malheur Forest Plan provides guidance for the protection of nests, the protection of habitat surrounding nests, and minimizing disturbance to nesting individuals.

The northern goshawk, a "true" hawk highly adapted for forested landscapes, is found throughout the intermountain west (Hanauska-Brown and Bechard 2003). In the Pacific Northwest, goshawks prefer to nest in mature, unlogged, or lightly managed forested habitats. These areas include sites with closed canopies (greater than 60 percent), northerly exposures, gentle slopes, and close proximity to water (Reynolds et al. 1992). Canopy closure is an important factor in nest site selection and, in the desired percentages, provides security from avian predators and decreases impacts from human disturbance. Nest trees are typically dominant trees in the canopy (10 to 58 inches DBH) and are usually in Douglas-fir, ponderosa pine, and western larch (McGrath et al. 2003).

Recent peer-reviewed research suggests that goshawks forage in a variety of forested and non-forested environments (Brewer et al. 2007). Small openings and forest edges in mixed conifer and ponderosa pine forests, in particular, appear to be important for foraging. These foraging habitats support higher plant diversities and, in turn, support a higher number of desirable prey species such as rabbits, squirrels, and grouse.

Because it decreases availability of appropriate nesting habitat, timber harvest methods that create large areas of reduced canopy cover (less than 35 to 40 percent cover) are considered a primary threat to breeding goshawks (Beier and Drennan 1997, Bright-Smith and Mannan 1994). In addition, increased human presence could also displace the northern goshawk during nesting.

Amendment 2 established minimum standards for protection of the northern goshawk, stating that "until further information is known and management plans approved to ensure species viability, the following standards are to be met as a minimum." The minimum standards that are still in effect are:

- Protect every known active and historically used goshawk nest site from disturbance. "Historical" refers to known nesting activity occurring at the site in the last 5 years. Seasonal restrictions on activities near nest sites will be required for activities that may disturb or harass a pair while bonding and nesting.
- 30 acres of the most suitable nesting habitat surrounding all active and historical active nest tree(s) will be deferred from harvest.
- A 400-acre "post fledging area" will be established around every known active nest site. While harvest activities can occur within this area, retain late and old structure (LOS) stands and enhance younger stands toward LOS condition, as possible.

There is one known nesting territory within the project planning area. A 400+ acre post-fledging area (PFA) was mapped for this territory. A nest stand has been delineated for the territory and meets the 30-acre requirement as required by the Eastside Screens.

The active goshawk territory in the Magone project planning area is within the Warm Dry biophysical environment and consists of ponderosa pine or ponderosa pine and mixed conifer stands. The territory is located near Magone Lake and the pair is likely accustomed to human activity and noise associated with recreation around the lake.

Additional habitat outside the PFA exists within the project planning area. Habitat queries identified 7,818 acres of suitable northern goshawk reproductive habitat within the project planning area and 170,500 acres on the Forest. The 7,818 acre total includes those acres identified within the PFA.

### *Effects to Northern Goshawk*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed for the Magone Project would occur. In the short- to mid-term, the northern goshawk habitat within the project planning area would be maintained in the current condition. In the absence of disturbance, open pine stands would continue to transition to multi-story stands. In the long-term, habitat for northern goshawk could increase in some areas as stand density and canopy cover increases. Availability of habitat would depend on physical characteristics of the site as well, as nests are generally located near water in drainages or swales, and areas of gentle topography. Stand composition may deteriorate, as overstocking may actually retard the development of mature forests and larger trees, or reduce the mosaic of structural stages required for diversity of prey species.

In the absence of disturbance, within all of the northern goshawk territories, there would be a continued accumulation of surface fuels (litter and duff) and ladder fuels (small trees growing in and around larger trees). Fire hazard and risk of insect outbreaks would remain elevated for some stands.

Open road and trail density would remain the same as would the loss of snags due to firewood cutting. This loss of snags may reduce goshawk prey habitat, perch sites, and plucking posts.

**Conclusion** – The no action alternative would maintain the suitability of all existing habitat. Additionally, this alternative would not result in displacement of goshawks.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Habitat alteration, such as management activities, can affect nest occupancy and productivity (Crocker-Bedford 1998, Wisdom et al. 2000). Because it decreases availability of appropriate nesting habitat, timber harvest methods that create large areas of reduced canopy cover (<35 to 40 percent) are considered a primary threat to breeding goshawks (Beier and Drennan 1997, Bright-Smith and Mannan 1994). In addition, timber harvest activities near nests can directly cause nest failure (Boal and Mannan 1994).

Changes in forest structure related to fire suppression tend to increase cover and structure within source habitat for goshawk. However, due to a thicker understory component, some of the denser unburned forest stands may not be optimal goshawk habitat (Wisdom et al. 2000), particularly for foraging. These denser stands are more vulnerable to stand-replacing wildfires. Stand-replacing fires would represent total loss of forest structure and would subsequently greatly reduce goshawk nesting and foraging habitat.

Goshawks are generally highly sensitive to disturbance during the breeding season. Human disturbance to goshawk nests has been a suspected cause of nest abandonment (Reynolds et al. 1992).

**Magone Lake Nest Stand and Post-Fledging Area (PFA)** – No treatments are proposed within the one known nest stand under any action alternative in the project planning area. However, the proposed hiking trail from Magone Lake to the landslide overlook, which is considered under all action alternatives, would go through the southern edge of the nest stand and continue through the PFA. This could result in disturbance of nesting goshawks, nest failure, or nest abandonment by birds using this particular nest site. Although the pair of goshawks are likely accustomed to noise and human-caused disturbance due to their close proximity to the lake, disturbance this close to the nest would not likely be tolerated. This nest was active in 2013 but was unoccupied in 2014.

Light thinning treatments would occur on the eastern-most boundary of the PFA as part of a strategic fuel break along the edge of the Magone Lake recreation area. Project design criteria would limit activities in the goshawk nesting season and therefore direct disturbance or displacement would not occur from these activities. This small amount of thinning within the PFA would create a more open “roadside” stand that could conceivably create a small area more ideal for goshawk foraging, however the effect would be negligible.

The Magone Lake nest and PFA would be included within the extensive connectivity corridor under all action alternatives.

**Other Reproductive Habitat** – Habitat queries identified 7,818 acres of suitable reproductive habitat within the Magone project planning area (which includes the Magone Lake PFA). Therefore, it is expected that goshawk nest stands exist in the project planning area that were not discovered during surveys and ground reconnaissance. The following analysis considers expected effects of activities to goshawk habitat or individuals if nesting goshawks were present and unknown by District wildlife staff.

Commercial and non-commercial thinning of trees would reduce overall forest canopy cover in the short-term. This reduction in cover would likely impact northern goshawks and existing territories may be abandoned due to lack of preferred nesting and foraging habitat structure.

Disturbance during the nesting season could also cause nest abandonment and failure. However, available information on the impact of the above types of activities within the goshawk post-fledging area is limited and often conflicting. Reynolds et al. (1992) and Reynolds et al. (2008) states that goshawks select nesting habitat based on pray abundance and availability and therefore some treatments, particularly those that create certain prey habitats, could improve PFAs. Others such as Greenwald et al. (2005), argue that nesting habitat is selected based on certain habitat components alone and recommend that PFAs should not be treated. District records of northern goshawk displacement have primarily been associated with disturbance to the nest stand rather than the PFAs. Different birds exhibit various levels of tolerance to human activity or disturbance. Security for fledglings within some areas of the PFAs may be reduced. Although in the long-term, forest stand structure would be comprised of more late and old structure habitat, in areas where the focus of the activities in each action alternative is to accelerate single stratum structure, not the multi strata preferred by goshawks, and any long-term benefits to northern goshawks utilizing the project planning area are negligible. However, the extensive connectivity and overall amount of old forest multi strata (OFMS) not being treated across the project planning area would likely mitigate effects to unknown goshawk territories. Further, goshawks have been observed across the Malheur National Forest successfully nesting in non-traditional nest-type habitat (i.e., OFMS) and instead utilizing young forest multi strata, single-strata stands, and even plantation-like stands in one case. These activities may impact individuals or habitat, but overall, should not adversely impact northern goshawk populations.

Thinning could also alter foraging habitat by reducing canopy cover and, consequently, prey assemblages. However, literature is conflicting as to whether goshawks select stands based on prey abundance or forest structure (i.e., higher canopy closure, higher tree density). Goshawk nesting and breeding activities are more likely to be adversely impacted as a result of treatments in multi-strata stands than foraging (Drennan and Beier 2003), as goshawks forage on a wide variety of prey species (Reynolds et al. 1992). Generally, a diverse and complex post-fledgling area would support a more diverse prey base, resulting in more prey availability. Since denser unburned stands are also more vulnerable to stand replacing fires, thinning may potentially benefit goshawks in the long-term by reducing the risk of forest structure loss.

Prescribed fire could enhance goshawk prey conditions and is expected to help advance stands toward late or old structural conditions, although likely old forest single stratum. Individuals may be temporarily displaced, may have to travel farther for foraging opportunities, and hunting skills may be temporarily hindered by smoke during implementation of prescribed fire. However, underburning and prescribed fire are expected to enhance goshawk prey habitat, therefore a beneficial effect to goshawks.

The expansive bike trail network proposed in alternatives 2 and 3 could have varying levels of effect on nesting and fledging goshawks depending on the intensity of use from bikers. The highest levels of use would be expected during the most critical nesting and fledging times for goshawks (April 1 – August 15). Although intermittent interactions between bikers and goshawks would not likely result in nest or territory abandonment, repeated disturbance potentially could. The distance from trails that goshawks would feel secure and successfully nest is unknown, however it would be expected that eventually all goshawks in the project planning area would relocate nests and territories to avoid these trails.

Further, with 170,500 acres of suitable reproductive habitat across the Forest and 7,818 acres in the project planning area, adequate amounts of habitat would be available for nesting goshawks to disperse and relocate into within or outside of the project planning area.

Road construction would reduce habitat for goshawk prey species, and construction of temporary roads would fragment existing mature stands. However, open road densities would not substantially increase as a result of project implementation. As currently closed roads with unauthorized use are effectively closed, overall disturbance from vehicles is expected to decrease. New or temporary road construction would not dissect any known nest stands or PFAs, further limiting disturbance from roads.

Aspen treatment and protection would change overstory composition of aspen stands. Understory grass and forb cover could increase potentially increasing prey species for goshawk. Small openings in riparian areas, particularly with enhanced deciduous vegetation, could conceivably increase prey diversity, potentially increasing prey availability and abundance for goshawks. However, it is expected that the proposed aspen and riparian treatments would have negligible direct or indirect effects to goshawk individuals.

**Conclusion for Northern Goshawk** – Although treatments are proposed within reproductive habitat and PFAs, no treatment would occur within known nest stands. For all action alternatives, habitat would remain above the HRV for old forest multi strata and approach the HRV for old forest single stratum, both of which may have sufficient canopy cover to be reproductive habitat. However, some treated stands would be structurally less complex following treatment and, though still suitable, they may have reduced habitat quality immediately following treatment. Over time, stand complexity is expected to improve and may in the long-term result in habitat that is higher in quality than what may develop in some untreated stands.

There would be an adequate amount of nesting habitat available to goshawks displaced from nest stands and PFAs as a result of increased recreation along proposed bike trails in alternatives 2 and 3. There could be increased nest abandonment and failure, which could lead to decreased recruitment in the short-term. However, no loss of individuals would be expected from project activities under any action alternative. In the mid- to long-term, goshawks would acclimate to the increased presence of humans or move to other suitable nesting habitat within or outside the project planning area. Therefore, no effects to goshawk viability would be expected from the implementation of any of the action alternatives.

### 3.9.5.2 Blue (Dusky) Grouse

#### *Existing Condition for Blue Grouse*

Blue grouse prefer coniferous forest (Douglas-fir, grand fir, and sub-alpine fir) with a mixture of deciduous trees and shrubs near edges and openings.

Dusky grouse nest in a variety of forest and shrub vegetation types, from foothills to timberline. Dense coniferous thickets of small trees, stumps, and down logs are used by blue grouse for resting, drumming, and escape cover. Grouse also utilize dense deciduous areas in riparian corridors.

The Malheur Forest Plan standard for the protection of grouse habitat (USDA Forest Service 1990a, Forest-wide standard 50, page IV–30) states that projects "maintain grouse winter roost habitat." Winter range typically includes conifer forests from lower elevations to subalpine, and they generally utilize large, mistletoe infected Douglas-fir trees, generally located within the upper 1/3 of slopes, as winter roosts.

Past fire suppression in parts of the project planning area allowed for the encroachment of shade-tolerant conifer species, including Douglas-fir. Subsequently, increased stand densities have resulted in an increase in insect damage, disease, and parasitism, including dwarf mistletoe in mixed conifer stands.

Formal surveys for dusky grouse have not been conducted in the project planning area, but several individuals were documented during the breeding, nesting, and wintering periods. Winter roost habitat is present across the project planning area, with the most suitable areas in the northern portion of the project, particularly in and near the Nipple Butte Inventoried Roadless Area.

### *Effects to Blue Grouse*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Under the no action alternative, no management activities proposed for the Magone Project would occur. Habitat conditions would remain unchanged in the short- and mid-term. Over the long-term, increased stand densities and related stress would result in a greater incidence of insects and disease in the project planning area. Dwarf mistletoe, one of the diseases that increases with increasing stand densities, would increase where present within the project planning area. Winter roost habitat would also increase given an increase in mistletoe-infected Douglas-fir. Heavy gnarled limbs and dense foliage ("witches brooms") created by dwarf mistletoe would create ideal roosting habitat for blue grouse. In the event of a wildfire, however, uncharacteristically intense burns could effectively sanitize stands of dwarf mistletoe. When all trees are killed, reestablishment of dwarf mistletoe in stands could take decades, as seeds are reintroduced by birds and the mistletoe slowly spreads (Spiegel 2014).

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Harvest of mistletoe-infected trees potentially providing winter roost habitat for blue grouse would occur from commercial and non-commercial thinning under each action alternative. Activities that would remove Douglas-fir trees with mistletoe would reduce roost habitat and preferred forest structure. Since blue grouse depend on needles and buds of Douglas-fir and ponderosa pine during the winter, thinning of mature Douglas-fir and ponderosa pine would also impact winter food supplies. Larger, older trees over 150 years old would be retained. Younger trees less than 150 years, regardless of size, could be removed. As directed by the Malheur Forest Plan, design elements would be incorporated into harvest prescriptions to maintain winter roost habitat (see Appendix C – Project Design Criteria). Skips within units and no treatment areas would also retain trees that could potentially host dwarf mistletoe. Consequently, dwarf mistletoe is anticipated to be retained on the landscape.

It is written in the silviculture prescription to "provide blue grouse winter roosts" by "retaining large mistletoe infested or wolfy Douglas-fir trees, where available, at 5 to 8 trees per acre along ridge tops and large scab openings. Overall, it is expected that forest health would increase from implemented thinning treatments, resulting in a decrease in dwarf mistletoe.

Prescribed burning would directly remove nesting habitat and, if implemented during the primary nesting season, could cause direct mortality of blue grouse adults and offspring. However, grasses and forbs suitable for blue grouse nesting cover would be expected to establish and become denser and more vigorous within several years (2 to 5) after ignition events, resulting in enhanced habitat. Herbaceous vegetation conceals the broods and contains insects, an important food source for blue grouse (Mussehl 1963). In eastern Oregon, prescribed burning and additional methods that maintain park-like stands may benefit this species. Prescribed burning project design criteria would mitigate some expected direct impacts to blue grouse.

Project implementation would result in some level of disturbance and displacement of wildlife in the short-term by thinning activities. Routine disturbance and displacement along mountain bike trails proposed in alternatives 2 and 3 would be expected as long as the trails are being maintained and used. The level of disturbance and displacement would depend on the time of year, extent, and the tolerance of the species and individuals involved. Not all areas of blue grouse habitat would be impacted at any given time; any mistletoe-infected trees over 150 years old would be retained, habitat where no treatment was occurring would be available for blue grouse.

Roads open (temporary construction or maintenance of currently closed roads) during project implementation may allow increased access for personal use firewood cutting. Personal use firewood cutting reduces the number of snags adjacent to open forest roads. This activity does not affect live trees with a potential to be used by grouse; however, recently dead mistletoe-infected trees may be removed. Woodcutting generally occurs where topography is gentle, providing easy access; not all areas with roosting habitat are accessible to woodcutters.

Project design criteria state that clumps of mistletoe-infected Douglas-fir would be maintained at the top or upper slopes of ridges for winter roost habitat and therefore meet Malheur Forest Plan standards (USDA Forest Service 1990a, Forest-wide standard 50, page IV-30).

Aspen and riparian treatment and protection would change overstory composition of aspen stands. Small openings would be created in selected riparian areas, which could also change overstory composition in very small patches. Understory grass, forb, shrub, and downed wood cover could increase in both aspen and riparian areas selected for treatments. This would be anticipated to increase potential nesting, feeding, and hiding/loafing cover for blue grouse, as well as insects, an important food source.

**Conclusion** – All action alternatives contain project design criteria that follow Regional Forester's Eastside Forest Plan Amendment 2 standards for retaining grouse winter roost habitat. Action alternatives may affect grouse habitat, however, habitat would remain above HRV and no adverse effects would be expected to blue grouse habitat or populations from implementation of any of the action alternatives.

### 3.9.5.3 Osprey

*Existing Conditions for Osprey*

Osprey build nests in large old-growth trees with dead tops, or in the tops of large snags, usually in the vicinity of streams, rivers, or lakes with adequate fish populations. Osprey nests generally occur within 2 miles of fish-bearing streams and rivers (Marshall et al. 2006). On the Malheur National Forest, nests are large and bulky and placed at the top of what is usually a broken-off ponderosa pine snag. These trees are often larger in comparison and visible above the tops of the surrounding timber.

The Malheur Forest Plan standard for the protection of osprey nesting habitat states that projects "Maintain or create large nesting snags and green replacement trees for osprey within ½ mile of streams, lakes, or reservoirs that are currently used for feeding by osprey. Preference will be given to large ponderosa pine (30 inches or greater in diameter, 60 foot minimum height) with broken tops and large limbs, at a density of one per ¼ mile of linear stream length …" (USDA Forest Service 1990a, page IV–31).

Large ponderosa pine within the East Fork Beech Creek corridor and near Magone Lake provides the best potential nesting habitat for osprey within the Magone project planning area. However, because of frequent traffic and recreation associated with these areas, it is not expected that osprey are currently nesting in the area. Magone Lake is likely providing intermittent opportunistic foraging opportunities for osprey.

*Effects to Osprey*

**Alternative 1 (No Action) – Direct and Indirect Effects**

Due to the highly migratory nature of osprey and limited foraging opportunities in the project planning area, direct and indirect adverse effects to osprey or their existing habitat are not anticipated from the no action alternative.

**Alternatives 2, 3, and 4 – Direct and Indirect Effects**

Activities, such as thinning, that would remove potential or existing nest sites such as large trees and snags within close proximity (2 kilometers) to rivers and lakes could impact this species.

Under the action alternatives, suitable nesting trees and high quality snags would be protected. However, it is likely that some danger trees within potential habitat would be removed as a result of the proposed activities. Since ospreys are known to nest in areas adjacent to suitable foraging habitat (i.e., fish-bearing waterways), proposed thinning could adversely impact ospreys utilizing the area by direct removal of existing and potential nest sites. Although, in the long-term, accelerated growth by trees remaining in units after treatment activities would ultimately provide large mature trees and potential osprey nest snags in the future. Further, foraging opportunities in the project planning area would be limited to East Fork Beech Creek during late spring and early summer months and Magone Lake, which receives high levels of recreational use. It is expected that the project planning area receives infrequent use by osprey.

Osprey nests and foraging behavior have not been documented in the analysis area. Regardless, with implementation measures in place, it is expected that any suitable or potential osprey nest trees would be maintained and disturbance to nesting birds (if discovered) would be minimized.

**Conclusion for Osprey** – Nesting and foraging habitat within the project planning area is limited, and therefore there are no impacts expected to osprey that would result in a change in the number of individuals, populations, or prey species as a result of the any of the action alternatives.

### 3.9.5.4 Cumulative Effects to Featured Species

All past, ongoing, and reasonably foreseeable future activities (see Table 13 and Table 14) that may contribute to adverse cumulative effects to northern goshawks, blue grouse, and osprey or their habitat were considered. The area considered for cumulative effects is the Beech Creek watershed.

Active mining claims are not likely to affect foraging and nesting habitat for goshawk, blue grouse, or osprey. Therefore, mining claims are not likely to contribute to cumulative effects to goshawks.

Invasive plants lead to habitat degradation by competing with native vegetation. Project design criteria in the Magone project planning area would help with the establishment or spread of non-native plants. Further, the Record of Decision for the Malheur National Forest Site-Specific Invasive Plants Treatment Project (USDA Forest Service 2015b) would authorize herbicide, manual, mechanical, biological, and/or cultural treatments of invasive plants on the Forest. Future treatment of this infestation would cumulatively increase native plants, and thus improve blue grouse nesting and foraging habitat, as well as goshawk prey habitat.

#### *Cumulative Effects Specific to Northern Goshawk*

Past grazing practices may have impacted herbaceous and shrubby vegetation that provides important food for goshawk prey species. However, current livestock grazing practices, including forest plan standards, provide for a sustained production of palatable forage for grazing by livestock and dependent wildlife species. Overall forage is not considered a factor limiting goshawk population viability, and consequently cumulative changes to foraging habitat, whether positive or negative, may not contribute to a measurable change in goshawk populations.

Nesting habitat is typically the primary limiting factor for goshawks. Historical timber harvest within and adjacent to the project planning area was largely related to area settlement and mining activities during the late 1800s. The highest percentage of timber harvest included clearcutting of old growth and was not geared toward retention of mature forest structure. Since 1995, the Malheur Forest Plan, as amended, has directed the Malheur National Forest to conduct timber sales in a manner that moves stands towards old forest multi strata (OFMS) and old forest single stratum (OFSS) structural stages. Project design adheres to Malheur Forest Plan standards and guidelines, therefore stands would be managed to promote OFMS and OFSS development.

Northern goshawks are considered highly sensitive to disturbance during the breeding season; hence, design incorporates seasonal restrictions for activities on Forest lands located near known nest sites. The extensive trail system proposed in alternatives 2 and 3 would be expected to cumulatively add to the amount of goshawk disturbance and displacement during the breeding season. The additive effect would be much higher in alternative 3.

Road development, associated with logging activities, has also contributed to habitat loss and has fragmented habitat important for prey species. The Magone Project proposes temporary road construction, road decommissioning, and road closures.

In the short-term, road use and on-site work would include increased human presence in the area and increase noise and overall disturbance associated with activities. After project implementation, road closures and decommissioning would reduce effects to breeding and nesting goshawks.

In the short-term, implementation of any of the action alternatives would contribute to habitat loss and fragmentation for prey species. In the long-term, alternatives 2 and 3would contribute to possible acceleration of OFSS and OFMS structure in some areas and reduce catastrophic fire risk in treatment areas. Alternative 4 would further accelerate OFMS structure.

### *Cumulative Effects Specific to Blue Grouse*

Cumulatively, where livestock grazing coincides with nesting and foraging, grazing would likely reduce the height of ground vegetation and possibly degrade habitat. Prescribed burning would benefit blue grouse habitat in the long-term by encouraging reintroduction of native grasses and forbs.

Restoration of HRV in the dry forest types is expected to improve the health of the forest; reducing dwarf mistletoe-infested Douglas-fir, as well as reducing cover structure important to blue grouse. Wildlife and silviculture incorporated design criteria into each action alternative to retain mistletoe-infested Douglas-fir; this would aid in mitigating potential impacts to blue grouse individuals and their associated habitat as a result of timber harvest. Additional implementation criteria regarding shrub retention in prescribed burn units as well as riparian areas would further aid in mitigating potential impacts to blue grouse and their associated habitat.

The no action alternative would not contribute to adverse cumulative effects to blue grouse populations. The combined effects of the Magone Project proposed action alternatives and past, present, and reasonably foreseeable future activities would not be expected to adversely affect populations or viability of blue grouse within the analysis area.

### *Cumulative Effects Specific to Osprey*

Grazing and past timber harvest and thinning have affected the quality and quantity of nesting and foraging habitat in the project planning area.

Cumulatively, where livestock grazing occurs, water quality may become diminished and osprey foraging habitat may be impacted. Watershed improvements, geared toward protecting native fish populations and better distribution of livestock, may mitigate some of these impacts.

Historical timber harvest within and adjacent to the project planning area was largely related to area settlement and mining activities during the late 1800s. The highest percentage of timber harvest included clearcutting of old growth and was not geared toward retention of mature forest structure. The Malheur Forest Plan, as amended, has directed the Malheur National Forest to conduct timber harvest in a manner that moves stands towards OFMS and OFSS structural stages. Standards and guidelines including snag retention and green tree replacement as well as implementation criteria for mitigating disturbances to osprey are incorporated in the project design.

Project design criteria would be included to protect potential or newly discovered osprey nest sites, therefore cumulative adverse effects would not be expected to reduce population viability of osprey as a result of implementing any of the action alternatives in the Magone Project.

## 3.9.6 Migratory and Resident Birds

Forest Service and Bureau of Land Management Authorities Related to Bird Management.

### 3.9.6.1 The Migratory Bird Treaty Act of 1918 (MBTA)

The Migratory Bird Treaty Act implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the act, it is unlawful to pursue, hunt, take, capture (or kill) a migratory bird except as permitted by regulation (16 U.S.C. 703-704). The regulations at 50 CFR 21.11 prohibit the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, or possessing migratory birds, including nests and eggs, except under a valid permit or as permitted in the implementing regulations (Director's Order No. 131). A migratory bird is any species or family of birds that live, reproduce, or migrate within or across international borders at some point during their annual life cycle.

The U.S. Fish and Wildlife Service (USFWS) is the lead federal agency for managing and conserving migratory birds in the United States; however, under Executive Order 13186 all other federal agencies are charged with the conservation and protection of migratory birds and the habitats on which they depend. In response to this order, the Forest Service and Bureau of Land Management have implemented management guidelines that direct migratory birds to be addressed in the National Environmental Policy Act (NEPA) process when actions have the potential to negatively or positively affect migratory bird species of concern.

### 3.9.6.2 Executive Order 13186 (66 Fed. Reg. 3853, January 17, 2001) "Responsibilities of Federal Agencies to Protect Migratory Birds"

This Executive Order directs federal agencies to avoid or minimize the negative impact of their actions on migratory birds, and to take active steps to protect birds and their habitat. This Executive Order also requires federal agencies to develop Memorandums of Understanding (MOUs) with the U.S. Fish and Wildlife Service (USFWS) to conserve birds, including taking steps to restore and enhance habitat, prevent or abate pollution affecting birds, and incorporating migratory bird conservation into agency planning processes whenever possible. The Bureau of Land Management and Forest Service have both completed, and are currently implementing, their respective MOUs with the USFWS.

#### *Forest Service and USFWS Memorandum of Understanding (MOU):*

The purpose of this MOU is, *"to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the Parties, in coordination with State, Tribal, and local governments."*

**Under the MOU the Forest Service shall:**

*Address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans for national forests and grasslands, consistent with National Forest Management Act, Endangered Species Act, and other authorities listed above. When developing the list of species to be considered in the planning process, consult the current (updated every 5 years) USFWS Birds of Conservation Concern, 2008 (BCC), State lists, and comprehensive planning efforts for migratory birds. Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.*

**The Birds of Conservation Concern 2008**

In December 2008, the U.S. Fish and Wildlife Service released a Birds of Conservation Concern report (USDI FWS 2008a) that identifies species, subspecies, and populations of migratory and resident birds not already designated as federally threatened or endangered that represent the highest conservation priorities and are in need of additional conservation actions. The goal is to prevent or remove the need for additional Endangered Species Act bird listings by implementing proactive management and conservation actions. It is recommended that these lists be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." In the Forest Service and USFWS MOU, both parties shall: *Work collaboratively to identify and address issues that affect species of concern, such as migratory bird species listed in the Birds of Conservation Concern (BCC) and USFWS's Focal Species initiative.*

BCC 2008 is intended to stimulate coordinated and collaborative proactive conservation actions among Federal, State, Tribal, and private partners. The hope is that, by focusing attention on these highest-priority species, this report will promote greater study and protection of the habitats and ecological communities upon which these species depend, thereby contributing to healthy avian populations and communities.

### 3.9.6.3 Partners-In-Flight Bird Conservation Regions

Bird Conservation Regions (BCRs) are ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues. BCRs are a hierarchical framework of nested ecological units delineated by the Commission for Environmental Cooperation.

The overall goal of these BCRs are to list and identify the migratory and resident bird species (beyond those already designated as federally threatened or endangered) that represent our highest conservation priorities.

The Malheur National Forest is included in BCR 10 (Northern Rockies). BCR lists are updated every 5 years by the U.S. Fish and Wildlife Service.

**BCR 10: (Northern Rockies U.S. portion only)**

Bald Eagle (b)
Swainson's Hawk
Ferruginous Hawk
Peregrine Falcon (b)
Upland Sandpiper
Long-billed Curlew
Yellow-billed Cuckoo (w. U.S. DPS) (a)
Flammulated Owl
Black Swift
Calliope Hummingbird
Lewis's Woodpecker
Williamson's Sapsucker
White-headed Woodpecker
Olive-sided Flycatcher
Willow Flycatcher (c)
Loggerhead Shrike
Sage Thrasher
Brewer's Sparrow
Sage Sparrow
McCown's Longspur
Black Rosy-Finch
Cassin's Finch

(a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of threatened or endangered species.

### *Avian Conservation Planning (Migratory and Resident Birds):*

Migratory birds are those that breed in the United States and winter south of the border in Central and South America. Many of our well-known passerine songbirds, flycatchers, vireos, swallows, thrushes, warblers, and hummingbirds fall into this category. Most others are included in the resident category. Birds are a vital element of every terrestrial habitat in North America. Conserving habitat for birds will therefore contribute to meeting the needs of other wildlife and entire ecosystems (Partners-In-Flight Continental Plan). Continent-wide declines in population trends for many avian species have developed into an international concern and led to the creation of the North American Bird Conservation Initiative. Under this initiative, plans have been developed for the conservation of waterbirds, shorebirds, seabirds, and landbirds. The landbird initiative known as Partners-In-Flight (PIF) has developed a series of bird conservation plans for every state. Partners-In-Flight has gained wide recognition as a leader in the landbird conservation arena.

The Oregon and Washington Chapter of PIF, formed in 1992, has developed a series of publications aimed at assisting private, state, tribal, and federal agencies in managing for landbird populations. The most recent and applicable publications for the two state area have been conservation plans for landbirds.

**Partners-In-Flight Bird Conservation Plans:**

Five conservation plans have been developed by PIF covering the various geographic regions found in Oregon and Washington. These documents have been prepared to stimulate and support a proactive approach to the conservation of landbirds throughout Oregon and Washington. They represent the collective efforts of multiple agencies and organizations within Oregon and Washington. Participants included biologists from federal and state agencies, industry, private consulting firms, environmental organizations, and academia in order to ensure a full range of ideas and practicalities were addressed by the plans.

Recommendations included in the documents are intended to inform planning efforts and actions of land managers, and stimulate monitoring and research to support landbird conservation. The recommendations are also expected to serve as a foundation for developing detailed conservation strategies at multiple geographic scales to ensure functional ecosystems with healthy populations of landbirds.

The plans can be found on the OR-WA PIF website at www.orwapif.org. The plan applicable to this planning effort is the *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington*.

The overall goal of PIF bird conservation planning is to ensure long-term maintenance of healthy populations of native landbirds. These documents are intended to facilitate that goal by identifying conditions and habitat attributes important to the landbird community, describing the desired landscape based on habitat relationships of a select group of species, providing interim management targets (i.e., biological objectives) to achieve desired conditions, and recommending management actions (i.e., conservation options) that can be implemented by various entities at multiple scales to achieve the biological objectives.

Implementation of parts or all of the conservation strategy should help prevent reactionary approaches typically needed to address listed species issues. When these ecosystem-driven conservation strategies are fully implemented at large geographic scales, the aggregated effect will be the creation of landscapes that should function to conserve landbird communities.

The strategy for achieving functioning ecosystems for landbirds is described through the habitat requirements of “focal species.” By managing for a group of species representative of important components in a functioning coniferous forest ecosystem, many other species and elements of biodiversity also will be conserved. Executive Order 13186 and the MOUs signed by the Forest Service and Bureau of Land Management with the U.S. Fish and Wildlife Service require agencies to incorporate migratory bird conservation into agency planning processes whenever practicable. The PIF plans assist federal agencies in achieving this direction.

The appropriate bird conservation plan and Birds of Conservation Concern (BCC) species list for the Magone project planning area was reviewed. Those species and habitats that are within the project planning area are incorporated and effects disclosed in this analysis. Table 114 displays a list of BCC in the Magone project planning area that are known or likely to be present and could be affected by the proposed actions.

**Table 114. The U.S. Fish and Wildlife Service Birds of Conservation Concern found in the planning area. Bird Conservation Region 10 – Northern Rocky Mountains of eastern Oregon and Washington**

| Species | General habitat requirements | Impacts to habitat | |
|---|---|---|---|
| | | No action | Alternatives 2. 3, and 4 |
| Bald eagle | Associated with large bodies of water, forested areas near the ocean, along rivers, and at estuaries, lakes, and reservoirs. | See Threatened, Endangered, Proposed, and Sensitive Species section for analysis. | |
| Flammulated owl | Associated with ponderosa pine forests and mixed conifer stands with a mean 67% canopy closure, open understory with dense patches of saplings or shrubs. | Continued decline of open forest and early seral species. | Increase in grassy openings from commercial thinning and prescribed burning, but likely reduction of dense thickets from non-commercial thinning. Although suitable habitat remains below historical range of variability, there would be an increase for all action alternatives. |
| Calliope hummingbird | Predominantly a montane species found in open shrub sapling seral stages (8 to 15 years) at higher elevations and riparian areas. | Continued decline of habitat as result of increased stand densities. | Forest gaps would increase open shrub sapling stages on 5 to 20% of treated areas and across 5,500 acres of upland shrub enhancement treatments in alternatives 2 and 3, and 1,685 acres in alternative 4. |
| Lewis's woodpecker | Ponderosa pine, cottonwood riparian or oak habitats with an open canopy, brushy understory, dead and down material, available perches and abundant insects. | See Threatened, Endangered, Proposed, and Sensitive Species section for analysis. | |
| Williamson's sapsucker | Eastern Cascades, mid- to high-elevation, mature open and mixed coniferous - deciduous forests. Snags are a critical component. | See Management Indicator Species –Dead and Defective Wood section for analysis. | |
| White-headed woodpecker | Open conifer forests (<40% canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance. | See Threatened, Endangered, Proposed, and Sensitive Species section for analysis. | |
| Olive-sided flycatcher *(Contopus cooperi)* | Open conifer forests (<40% canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance. | Suitable habitat condition would continue to be limited until suppression mortality created gaps and edge habitat. | Thinning would create more open stand conditions and accelerate growth of larger trees that may become snags. Forest gaps would increase understory growth, |

| Species | General habitat requirements | Impacts to habitat | |
|---|---|---|---|
| | | No action | Alternatives 2. 3, and 4 |
| | | | contributing to increased insect production over the next 20 years. Increased forest edge habitat would also enhance foraging opportunities. Gaps created by thinning may allow foraging until the canopy eventually closes again and these opportunities are lost. Upland shrub enhancement treatments would create optimum foraging areas. |
| Willow flycatcher* | Associated with riparian shrub dominated habitats, especially brushy/willow thickets. In southeast Washington also found in xeric brushy uplands. | Continued decline of riparian habitats. Stream channels would remain gullied. Riparian vegetation would be further departed from historic conditions. | Hardwood treatments are designed to enhance hardwood species such as aspen, willow, alder, and cottonwood. |
| Cassin's finch | Open, mature coniferous forests of lodgepole and ponderosa pine, aspen, alpine fir, grand fir, and juniper steppe woodlands. | Continued risk of loss of habitat due to uncharacteristic wildfire. | Warm Dry late and old structure is moved from old forest multi strata to old forest single stratum post treatment. Increased habitat suitability from aspen stand enhancement and thinning of young trees and upland shrub enhancement treatments. |

*Non-listed subspecies or population of threatened or endangered species.

# 3.10 Analysis Issue – Botanical Resources

## 3.10.1 Existing Condition

This section summarizes the biological evaluation (BE) for plants as well as the Botany Report. The BE process is outlined in the Forest Service Manual 2672.42 (USDA Forest Service 2005b).

The objectives of the biological evaluation process are:

1. To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant, or contribute to a trend towards Federal listing of any species.
2. To comply with the portion of the Endangered Species Act that requires that actions of Federal agencies not jeopardize or adversely modify critical habitat of federally listed species.
3. To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process.

This section describes sensitive plant species and their habitats potentially found in the project planning area. Project design criteria (PDCs) were developed to help protect both known sensitive plant populations, and potential sensitive plant habitat. See Appendix C – Project Design Criteria for detailed PDCs. Potential direct, indirect, and cumulative effects of the alternatives on known sensitive plant populations and potential sensitive plant habitat are also presented in this section. Effects analysis determinations follow definitions as outlined in Forest Service Manual 2672.42.

### 3.10.1.1 Malheur National Forest Plant Habitat Groups

Sensitive plants tend to grow in specialized habitat types within broader plant communities. For example, some species are found in moist swales and depressions within general sagebrush habitat. Other species occur in the transition zones between habitat types. For this analysis, plant communities and special habitats have been grouped into broad habitat association groups. Culturally significant plants are also discussed under their various habitat groups.

Potential vegetation groups discussed here are described in USDA PNW-GTR-709 *Potential Vegetation Hierarchy for the Blue Mountains Section of Northeastern Oregon, Southeastern Washington, and West-Central Idaho* (Powell et al. 2007). According to this report, “Potential vegetation is defined as the community of plants that would become established if all successional sequences were completed without interference by humans, under existing environmental conditions including edaphic, topographic, and climatic factors. Potential vegetation is used to characterize biophysical settings, and their associated potential natural communities. Potential vegetation groups are named for a predominant or controlling temperature or moisture relationship.” Only the more prevalent potential vegetation groups are included in the following discussion. They will be used to characterize habitat groups for the sensitive plants that may be found on the Malheur National Forest. Acres of each habitat type listed here are from the Malheur National Forest FS Veg database.

Ninety (90) Region 6 sensitive plant species may potentially occur on the Malheur National Forest. Since there are so many potential sensitive plant species on the Forest, it is more efficient to talk about broad habitat types, rather than each individual species.

Each sensitive plant species has been assigned to one or more of each of the described habitat groups. See Appendix 1: Malheur National Forest Sensitive Plants Grouped by Habitat Type in the Botany Report. In order to simplify the analysis, it is assumed for the effects analysis that all plants growing in a particular habitat would have similar responses to activities. It is acknowledged that there are some species-specific differences, such as annual species versus perennials with deep-rooted bulbs. However, the overall effects should be relatively similar. Potential project effects will be discussed in regards to the habitat type affected. Sensitive species documented in the project planning area are discussed individually.

Most areas that do not support trees are described simply as “non-forested” or “shrubland” in the Forest Service existing vegetation database and associated GIS layers. There is generally no further distinction for various shrub and grassland types. Due to this generalization, it is not possible to quantify how many acres of various habitat types are present in the project planning area. Only habitat types that occur in the project planning area will be discussed.

### *Forested Communities*

Forested plant communities on the Malheur National Forest are generally dominated by conifers. Potential vegetation groups are split out based on temperature and moisture regimes. Although these communities are discussed separately here, effects from project activities will be discussed collectively in terms of potential effects to the four larger groups: upland coniferous forests, upland woodlands, warm riparian (deciduous) forests, and cold riparian forests.

#### Cold Upland Coniferous Forest (1,080 acres in project planning area)

Cold upland forests on the Malheur National Forest range from moderate elevation areas with lodgepole pine as the climax tree, through subalpine fir dominated areas, and up to white bark pine forests in the highest and coldest areas. The plant association groups are the Cool Dry, Cold Dry, and Cold Moist. Common shrubs include grouse huckleberry and common juniper. These areas are characterized by their short growing season. There is relatively little of this community in the Magone project planning area.

#### Moist Upland Coniferous Forest

Moist upland forest types include Warm Moist, Cool Moist, and Cool Wet plant association groups. The dominant climax species of trees in these areas range from Douglas-fir in warmer sites, to grand fir in moist areas, to lodgepole pine in higher elevation or cooler areas. Shrubs in these areas include Rocky mountain maple and Pacific yew. Moist site indicator herbs include twin-flower, queens’ cup bead-lily, and heartleaf arnica. Several understory species in these forest types are culturally significant plants. They are collected for foods and herbal medicines. Morel mushrooms are also commonly found in these forest types. Although some morels are found in undisturbed areas, they often fruit more abundantly after disturbance caused by animals, logging, or fire. Big huckleberry is an important food plant found in these areas. Traditionally collected by Native Americans, huckleberry is now collected by many other people. On the Malheur National Forest, virtually all collection of huckleberries is for personal, non-commercial use. This habitat type has been heavily altered due to timber harvest and fire suppression.

#### Dry Upland Coniferous Forest

Dry upland coniferous forest types include Hot Dry and Warm Dry plant association groups. The Hot Dry forests are those areas that have ponderosa pine as their climax tree species. The driest sites have inclusions of juniper. The understory consists of dry site indicator shrubs, such as bitterbrush and Oregon apple (*Peraphyllum ramosissum*), as well as bunchgrasses and elk sedge.

Warm Dry forests include ponderosa pine, Douglas-fir, and grand fir as their climax species. The understory is often dominated by low shrubs, such as snowberry, pinemat manzanita, and birch-leaf spiraea. The main grasses and sedges found here are pinegrass, Ross' sedge, and Geyer's sedge. These forest communities are found across the Malheur National Forest.

These plant communities occur in areas that historically were heavily logged. Outside of roadless areas, most of the large old ponderosa pine and Douglas-fir have been removed. Fire exclusion has facilitated the growth of relatively thick stands of younger trees in many areas. Much of this habitat type is now in uniform plantations of young trees. Relatively few sensitive plant species are suspected to occur in these areas; those that are found rely on deep organic duff, or slightly moister sites within the broader area. The database shows that dry upland coniferous forest accounts for the vast majority of the acres in the project planning area.

**Upland Woodlands**

Upland woodlands are characterized by the presence of juniper as the climax dominant species. Both dry and moist upland woodlands are included. In many areas, mountain mahogany is found growing with the juniper. It tends to occur on rocky ridges or in otherwise drier areas. The understory in these communities often includes low sagebrush, bluebunch wheatgrass, and/or Idaho fescue. These communities are found most extensively on the southern portion of the Forest. Fire exclusion has facilitated the growth and expansion of juniper in these areas. The main sensitive species in this community is the cordilleran sedge; it has been found often associated with mountain mahogany, as well as in the riparian zones in these areas. The other sensitive species listed here are generally found in unusual soil outcrops, on barren rocky ridges, or in moister microsites within the broader community. Bitter-root and various biscuit roots are culturally significant plant species that are found in these open rocky habitats.

In the Magone project planning area, much of what may appear to be this habitat type has been included in the Hot Dry upland forest stands (described above). Therefore, the estimate of 1,790 acres of upland woodlands may actually be low compared to what is on the ground. Most rocky ridgetops in the project planning area fall under this habitat type.

**Warm Riparian Forest (aspen, cottonwood) and Shrublands**

Aspen and cottonwood communities are included within the warm riparian forest potential vegetation group. This group also includes some grand fir plant associations. Riparian grand fir will be grouped for analysis with the Cool Moist vegetation group. Aspen and cottonwood patch sizes in these communities are usually less than 40 acres in size. Many patches are found as stringers along streams and intermittently wet draws. The fire frequency interval has not been established for the warm riparian forest potential vegetation group. Findings documented in Quigley et al. (1997) show that fire exclusion has resulted in declines in aspen communities within the Interior Columbia Basin. This has largely resulted from conifers competing with the aspen. Grazing has also altered the reproductive and growth cycles of both aspen and cottonwoods. There are relatively few acres of these habitats in the Magone project planning area. Most riparian areas in this project planning area are dominated by conifers, rather than cottonwoods or aspen.

Warm riparian shrublands are found in narrow bands along streams and around wetlands. They often are found as understory with conifers growing in the adjacent uplands. Shrubs that are indicative of this vegetation group include mountain alder, water birch, and various willows.

In addition, lower-growing shrubs such as currants, choke-cherry, and red osier dogwood are often associated with these areas. The stream banks are often covered with native sedges and grasses. Introduced Kentucky bluegrass has also successfully colonized many of these areas.

Some aspen are found in the project planning area in isolated patches within the much drier surrounding forest. The understory plants in these areas are more indicative of the surrounding dry forest than plants found in typical riparian plant communities. Upland stands of aspen with conifer encroachment are often targeted for restoration. Sensitive plants are more likely to occur in the wetter areas that support aspen and cottonwood.

Aspen stands are well delineated in the Malheur National Forest GIS. Other warm riparian forest and shrub types are generally not well documented in the Forest Service vegetation database; however, they can generally be identified in the Forest GIS by their association with the stream layers.

### *Non-Forested Dry Upland Communities*

#### Sagebrush Shrubland

Sagebrush shrublands are communities with at least 5 percent crown cover of various species of sagebrush. Potential vegetative communities include several plant associations dominated by big sage (*Artemisia tridentata*), three-tip sage (*Artemisia tripartita*), or low sage (*Artemisia arbuscula*). Stiff sagebrush (*Artemisia rigida*) communities are included under the habitat group lithosol.

Sagebrush in the Blue Mountains generally is killed by high intensity fire. The exclusion of fire has led to higher densities of sagebrush than may have historically occurred in these habitats. Historically, sagebrush was purposely killed in many parts of the west to provide more grass for cattle forage. Sagebrush habitats often have small inclusions of slightly different microhabitats. These include vernally wet swales and outcrops of barren ash soils. Small inclusions of lithosols are also found in many areas of more general sagebrush habitat. Many sensitive plants that may be found in the sagebrush shrubland community type are found in these extremely limited microsites within the broader sagebrush community.

The Magone project planning area currently supports little sagebrush. It is not possible to know how much sagebrush historically occurred in the area. There are some plants of stiff sage and low sage in the rocky ridgetop sites. The Forest GIS vegetation layer shows 68 acres of Hot Dry upland shrubs; however, sage is also found in areas that are mapped as Hot Dry upland forest and Hot Dry upland woodlands.

#### Lithosol

Lithosols are habitats with very shallow soils on poorly weathered basalt or andesitic bedrock. This habitat type is often called scabland. While the soils can be saturated following spring snowmelt, they dry quickly and are exposed to full sun the entire growing season. Plants adapted to this harsh environment usually bloom and fruit early in the growing season. Basalt lithosols can be found in the dry upland shrubland potential vegetation group (68 acres mapped in the planning area), and the dry upland herbland potential vegetation group (84 acres mapped in the planning area). Basalt lithosols may also be found as small inclusions within a larger matrix of grassland and shrublands. Given the low productivity and discontinuous fuels in this habitat group, low intensity fires have probably burned infrequently in this habitat type.

Non-native grasses such as cheatgrass (*Bromus tectorum*), medusa head (*Taeniatherum caput-medusae*), and North Africa grass (*Ventenata dubia*) have invaded many of these sites. The presence of non-native grass species has the potential to alter the intensity of fires in these habitats.

Lithosol habitat supports two sensitive rice grasses, Henderson's rice grass (*Achnatherum hendersonii*) and Wallowa rice grass (*Achnatherum wallowaense*). The woven spore lichen (*Texosporium sancti-jacobi*) is also found in this habitat type. Bitter-root and various biscuit roots are culturally significant plants found in this habitat type.

#### Cliffs, Rock Outcrops, and Talus

Cliffs and rock outcrops have vertical rock faces. Talus consists of accumulated boulders and cobbles at the base of cliffs or on steep slopes. This habitat type is not discussed on the potential vegetation hierarchy for the Blue Mountains.

This habitat type is generally limited on the Malheur National Forest. There is often an abundance of ferns, mosses, and lichens growing on these outcrops. Some of the sensitive plant species that occur in this habitat type include Bridge's cliff-brake (*Pellaea bridgesii*), many-flowered phlox (*Phlox multiflora*), and several mosses. Some sensitive plants that occur in this habitat type are further restricted to specific, unusual rock types, such as limestone or argillite. The project planning area has a relative abundance of rock outcrops and small cliffs. These are derived from basaltic andesite lava flows.

### *Aquatic and Riparian Dependent Communities*

Aquatic and riparian habitats are collectively defined by high soil moisture and/or running water. There are several significantly different aquatic and riparian plant communities on the Malheur National Forest. They are described in detail below. These wetland and riparian areas provide important habitat for many of the sensitive plants on the Forest. Because the Malheur Forest Plan directs management of these habitats similarly under direction for riparian areas, the effects to species dependent upon these habitats will be addressed together in the effects analysis.

These community types are generally not mapped in the Forest Service GIS vegetation layer. They are often identified on the National Wetlands Inventory maps as freshwater emergent wetlands or riverine habitats.

#### Springs and Seeps

Springs and seeps are points where groundwater emerges and flows. Springs and seeps are typically small but well distributed on the Malheur National Forest. Many springs are mapped in GIS. Seeps are generally less well documented on the Forest. Seeps and springs are often developed for cattle troughs. Many of these areas have been dewatered and/or trampled due to these developments. Many developed springs now have fences to protect the water source. These areas provide important habitat for several sensitive plant species, most notably mosses and liverworts. Springs are scattered in this project planning area. There is a concentration of springs and seeps in the northwestern portion of the project planning area; this is where a rare grape fern was found in 2013.

#### Aquatic Habitats

Aquatic habitats include areas with standing water at least part of the year. These include ponds, lakes, streams, and rivers. These areas support plants that are free-floating or are rooted at the bottom under the water. Some ponds only have standing water in the spring.

This habitat type is very limited on the Malheur National Forest. The larger ponds and lakes are identified in GIS. Many ponds on the Malheur National Forest are human-created stock ponds; these are generally mapped in GIS. This habitat type is not addressed in the potential vegetation hierarchy guide. Aquatic habitats support unique groups of plants that cannot grow anywhere else. There are only a few sensitive plants that are suspected to occur in these habitats on the Malheur National Forest. Culturally significant species that are found in these areas include bulrush, wapato, and cat-tails.

In the Magone project planning area the main aquatic habitat is provided by Magone Lake. This lake has steep sides and does not support much riparian habitat around the edge. In addition, there are very few aquatic plants growing in the standing water.

**Intermittent and Perennial Streams**

Perennial streams are channelized areas where water flows all year long. These are classified as stream category 1 (fish-bearing) or stream category 2 (non-fish bearing). Intermittent streams are channelized areas where water runs only part of the year. Most of the moisture in these streams comes from snowmelt runoff. These areas are classified as stream category 4 for riparian management standards and objectives. These habitat types are generally quite narrow on the Malheur National Forest; they often extend upslope less than 100 feet above the water level. In flatter areas, they transition into moist and wet meadow types. Streams on most portions of the forest are dominated by trees. The potential vegetative groups in the forested areas have been described above under riparian forest types.

This habitat type is where many sensitive plant species occur. Many of the riparian areas have relatively high humidity. This condition provides excellent habitat for non-vascular plants (mosses, liverworts, and lichens). Several sensitive plant species are also found in the transition zone between the riparian zones and the surrounding uplands. Culturally significant plants that occur in this habitat type include Pacific yew, red osier dogwood, willows, elderberries, and chokecherries.

**Moist and Wet Meadows**

Moist meadows are typically saturated in the spring, but by mid to late summer the water table has fallen below the soil surface. Wet meadows are saturated throughout the growing season with the water table at or slightly below the soil surface. For riparian management and mapping in GIS, the wet meadow areas greater than one acre are called stream category 3 and those less than one acre are stream category 4. Moist and wet meadows are classified by the National wetlands inventory as freshwater emergent wetlands. Potential vegetation groups included here are the warm riparian herb, and the cool associations of the cold riparian herb group. This habitat type is where many sensitive plant species occur. Most rare non-vascular plants are found in these habitat types. Several sensitive plant species are also found in the transition zone between the wet or moist meadows and the surrounding forest or otherwise drier areas. This habitat type is very limited in the project planning area. The National wetlands inventory map only shows a total of 20 acres of either freshwater emergent, or freshwater forested or shrubland wetland types in the project planning area. The rare plant Bolander’s spike rush was found in one of these mapped areas.

### 3.10.1.2 Federally Listed, Proposed, or Candidate Plant Species

There are no federally threatened, endangered, or proposed plant species or potential habitat documented or suspected to occur on the Malheur National Forest.

**White bark pine** (*Pinus albicaulis*) is a candidate for federal listing. This is due to concerns regarding the species' decline caused by introduced white pine blister rust and native bark beetles. White bark pine is found only in subalpine habitats, usually near timberline. Sites are usually fairly dry, with thin, rocky, cold soils. This tree occurs throughout western North America. Global warming may also become a threat as the species occupies the highest elevation sites available and the trees cannot migrate higher to avoid warmer temperatures. This combination of threats seriously affects the species throughout its range.

The Magone project planning area does not have the high elevation habitats necessary for white bark pine. There are no known occurrences or habitat in the project planning area.

### 3.10.1.3 Sensitive Plant Species

The following sensitive species are documented in the project planning area. Specific locations of sensitive plant populations and their geographic relationship to proposed project activities are documented in the project file. See Appendix 3: Documented Sensitive Plants and Status in Project Planning Area for a summary of global and state rarity ratings for each of these species. This appendix also lists the number of documented populations for these species on the Malheur National Forest and in the project planning area in the Botany Report.

**Bolander's spikerush** (*Eleocharis bolanderi*) is a small grass-like plant in the sedge family. It grows in vernally wet swales, along intermittent streams, and in wet depressions in moist meadows. Plants are found in slight depressions that hold snow later in the season than surrounding areas. The habitat dries out by mid-summer. The surrounding forest is usually ponderosa pine. The range of this species includes the Cascade Range and Blue Mountains in Oregon. It is also found in California, southeastern Idaho, and Utah. It has been found in scattered locations on the Malheur National Forest.

In the Magone project planning area this species was found in four small populations, with an estimated total of 4,500 plants. This plant is hard to count, as they tend to grow in clumps and it is hard to tell where one plant ends and another begins. The plants occupy slightly less than 10 acres. All of the populations are in the eastern portion of the project planning area, located within a 1-mile by 2-mile area. The channel where one population occurs is experiencing active head-cutting. This has probably led to a lowered water table. Most of the plants in this population are along the edge of the vernally wet channel. A few plants were found in the surrounding dry upland meadow. This may indicate that more plants historically occurred in the currently dry meadow. There is also a stock pond within 100 feet of this population. Use by cattle may have caused erosion and the down cutting of the stream, which probably lowered the water table. It was noted that some of the Bolander's spike rush plants had been grazed at this site by the end of summer 2014.

**Crenulate moonwort** (*Botrychium crenulatum*) is a small spore-bearing plant that usually grows in and around the edges of wet meadows, riparian areas, or springs. Forest types include moderate elevation mesic forests to lodgepole pine and subalpine fir forests. This species is found in appropriate habitats throughout northern North America. It has been documented on all Blue Mountain forests.

There are currently 38 documented population of this species on the Malheur National Forest. Some of these records are old, the current status of the populations is not known.

There is one single plant of this species documented in the project planning area. It is located along the edge of a spring in the headwaters of Nipple Creek. No grazing by domestic animals was noted at the time this plant was discovered in 2014. It is highly likely that more plants of this species, and potentially additional species of moonworts, are present in the project planning area.

Identification of threats to moonworts is somewhat challenging because much information is lacking on habitat requirements, environmental tolerances, and the effects of management. Information on known occurrences indicate that off-road vehicle damage, camping and hiking, timber harvest and firewood cutting, exotic plants and herbicides, succession to closed canopy (fire suppression), and road widening and maintenance are threats (Ahlenslager and Potash 2007).

**Least phacelia** (*Phacelia minutissima*) is a tiny (less than 4 inches tall) annual plant in the phlox family. It is found in moist, open places, along streambanks, in vernally wet meadows, and in ephemerally moist swales. The surrounding forest is usually ponderosa pine or Douglas-fir. It is often found with false hellebore (*Veratrum californicum*). It has been found growing with aspen in Washington State. This species is found widely scattered in the intermountain west. It has been found around the flanks of the Wallowa Mountains, as well as in scattered locations on the Malheur National Forest.

There was a historically known site (from 2001) for this species that was relocated in 2014. The population is on the extreme eastern edge of the project planning area. Two hundred plants were counted in a drainage ditch and in another small area that is wet in the spring. There is a dispersed campsite very close to part of this population. There is also a risk that road maintenance could change the drainage pattern and potentially bury the site with gravel. This plant is extremely hard to detect and it is highly probable that there are additional populations of this species in the project planning area.

#### 3.10.1.4 Culturally Significant Plant Species

Many plant species may be used for food, medicine, or fiber products. Every habitat in the project planning area supports some plant species of interest to humans. Some more commonly known culturally significant plant species are listed above with their respective habitat types. Members of Native American tribes and the general public collect various species for different uses. Some habitat types harbor more species than other habitat types; for example, shallow soiled areas often support several species that are gathered for their edible roots. Other species are found commonly in wet meadows.

In the Magone project planning area there are many species of plants that have cultural significance. Since these species are so widespread, and often common, the Forest Service does not map or track these species. Commonly collected species in the Magone Project area are big huckleberry, yampa, camas, bitterroot, and morel mushrooms. Other berries and roots are also likely collected for food, medicine, and ceremonial purposes.

## 3.10.2 Environmental Consequences

### 3.10.2.1 Indicators for Assessing Effects

No botany related key or analysis issues, or indicators were identified during scoping. The following analysis will focus on effects as outlined in the biological evaluation process.

#### *Methodology*

Each sensitive plant species has been assigned to one or more of the described Malheur National Forest sensitive plant habitat groups (see Appendix 1: Malheur National Forest Sensitive Plants Grouped by Habitat Type in the Botany Report). It is assumed for the effects analysis that all plants growing in a particular habitat will have similar responses to project activities. Potential project effects will be discussed in regards to the habitat type affected. When particular species are documented in the project planning area, these will be discussed individually.

Since all of the action alternatives include similar activities and project design criteria, the analysis will focus primarily on a general discussion of potential effects. Then the individual alternatives will be compared in relation to the amount of area proposed for the various activities.

#### *Incomplete and Unavailable Information*

Landscape scale analysis does not allow for detailed site-specific plant surveys. Most surveys for this project were done before specific ground disturbing activities had been proposed. It is possible that activities could be implemented in areas that will not be surveyed. Therefore, there may potentially be effects to undiscovered populations of sensitive plants.

The only sensitive fungus currently suspected on the Malheur National Forest is the umbrella false-morel (*Pseudorhizina californica*). Fungi only fruit under very specific moisture and temperature conditions. Therefore, it is very difficult to locate species of fungi due to their ephemeral nature. It is possible that there are undocumented populations of the umbrella false-morel in the project planning area.

Some sensitive plant species do not produce above-ground plants every year. These plants include some grape-ferns (*Botrychium* spp.) and many annual species, which are dependent upon sufficient early spring rains. Some of the annual sensitive species include least phacelia (*Phacelia minutissima*), disappearing monkey flower (*Mimulus evanescens*), dwarf evening-primrose (*Camissonia pygmaea*), annual muhly grass (*Muhlenbergia minutissima*), lowland tooth-cup (*Rotala ramosior*), and desert chaenactis (*Chaenactis xantiana*). It is therefore possible that surveys may not detect these plants in years when conditions do not favor germination.

Some species, such as the least phacelia, annual muhly grass, and grapeferns, are so tiny and difficult to find in dense vegetation that even expert botanists may overlook them during surveys. Many of the non-vascular plants are very difficult to identify; it is possible that botanists may also overlook some of these species. For these reasons, it is not possible to state with complete certainty that all sensitive plant species would be detected during sensitive plant surveys.

There are no empirical studies on the effects of logging, burning, or grazing to most sensitive plant species that occur on the Malheur National Forest. The strategy for management of known populations has generally been avoidance of activities that may affect populations.

Therefore, all discussion of potential effects to sensitive plant populations and habitat is based upon general experience and inferred responses based upon observations and studies of more common species.

### *Spatial and Temporal Context for Effects Analysis*

The spatial context for this analysis is the project planning area. This scale is large enough to identify trends to sensitive species that could result from implementing this project. Since plants do not generally move over large areas quickly and no downstream effects are anticipated, it is not necessary to analyze effects to sensitive plants outside of the project planning area.

The temporal context for effects analysis includes short-term and long-term effects. Short-term effects for this analysis are considered to be 1 to 2 years after project implementation. These would generally be from direct effects, such as ground disturbance or incineration. Long-term effects for this analysis are considered to be longer than 2 years. These effects would generally be from indirect effects, such as changes in sunlight, hydrologic regimes, and changes in animal grazing patterns and intensity.

### *Basis of Effects Determinations*

The four possible effect determinations for sensitive plants are outlined in Forest Service Manual 2670. These definitions were used to guide the determination of effects:

- **NI →** When sensitive species occur in habitats that are not expected to be directly or indirectly affected in any way, they are given a "**no impact**" determination. This is also used for known specific existing populations where no project activities are proposed, or the population is buffered or otherwise protected from project activities.

- **BI →** When sensitive species, and their potential habitats, are expected to be favorably affected by a particular alternative, they are given a "**beneficial impact**" determination.

- **MIIH→**When sensitive species, and their potential habitats, occur that could possibly be negatively affected, they are given a determination of "**May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**". This determination is used in cases where there is unsurveyed potential habitat, or where potential effects are uncertain, or considered to be relatively minor.

  The MIIH determination acknowledges that the action could have negative impacts, but the degree of consequences is not known with certainty due to the following factors:

  1) the complexity of the proposed action,
  2) the differential impacts across the landscape, and/or
  3) the lack of best available science.

  Additionally, this recognizes that even the most substantial effects of the proposed action will not contribute to a trend toward listing the species under the Endangered Species Act. The effects are expected to be minor enough that they will not cause a loss of viability of the species in the project planning area.

- **WIFV →** When sensitive species, and potential habitat, occur that will most likely be negatively affected by the project, they are given a determination of "**Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing, or cause a loss of viability to the population or species**". This determination is used in cases where negative impacts will clearly occur, and they are of a magnitude that they may contribute to crossing a threshold leading to federal listing under the Endangered Species Act.

### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects*

In the past, present, and reasonably foreseeable future, there have been, and will continue to be, projects and activities within the project planning area that may affect sensitive plants and their habitats. Projects and activities that create ground disturbance, change vegetative composition, and change domestic animal grazing patterns may potentially cause detrimental effects to sensitive plant populations and habitats. These actions include road construction, timber harvest, fuel reduction treatments (landscape and pile burning, lopping, and scattering of slash), fire suppression, recreation development, mining, and livestock grazing. In addition, restoration efforts such as road decommissioning, and stream improvements may also potentially negatively affect sensitive plant populations and habitat. Road construction and recreation developments have permanently altered native plant habitat in limited areas of the project planning area.

Livestock grazing has occurred in most of the project planning area for decades and has resulted in changes in plant communities, especially in non-forested and riparian areas. Grazing has a direct effect on plants through plant herbivory and trampling. Grazing can have an indirect effect on plant species by causing changes in shade, soil compaction, soil disturbance, smothering by cow pies, and alteration of nutrient cycling. The degree of effect to plant species from grazing is related to the timing, duration, and intensity of the grazing action, as well as the individual characteristics and habitat requirements of the species. Grazing will continue to occur in the project planning area.

A court decision in 2002 concluded that the Malheur National Forest noxious weed control environmental assessment was insufficient under NEPA. The Forest has been limited to non-chemical eradication methods since this ruling. Because of this restriction on treatment methods, and limited funds, non-native invasive plants have undoubtedly increased in the project planning area over time. Non-native invasive plants may potentially outcompete and dominate sensitive plant habitat. The Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015a) added the use of herbicides for treatment of these species, thus the cumulative effects from non-native invasive plants should be reduced over time.

The historical abundance and distribution of sensitive species on the Forest is not known. Past activities have likely affected their current abundance and distribution. Beginning in approximately 1990, botanical surveys and biological evaluations were conducted for most Forest Service projects planned and implemented on the forest. As a result, activities conducted since 1990 have been designed to reduce negative effects to sensitive species.

### *Pre-Field Review: Existing Populations and Surveys for Sensitive Plant Species*

A pre-field review was conducted to determine the probability that sensitive plant populations and potential sensitive plant habitat are located within or adjacent to the project planning area. This information was used to determine the need for, and intensity of, botanical surveys.

The following sources of information were used to determine which species, and their respective habitats, may occur within or adjacent to the project planning area:

- U.S. Forest Service Region 6 Sensitive Species List (USDA Forest Service 2011).
- Malheur National Forest geographic information system (GIS) mapping layers (vegetation, streams and wetlands, aerial imagery).
- Project GIS layers showing potential activity units.
- Field Guide to Sensitive Plants of the Malheur National Forest (USDA Forest Service, unpublished document 2014); compiled from multiple public sources. Information includes associated habitats, species distributions, key identification characters, photos, and drawings.
- United States Department of Interior Fish and Wildlife Service (USDI-FWS) website. This website identifies which federally listed, proposed, and candidate species occur in each county of each state. This website was queried to determine which federally listed, candidate, and proposed plant species may occur in Grant and Baker Counties, Oregon.
- Forest Service Natural Resource Manager (NRM) database (USDA Forest Service 2015c). This database includes information on where botanical surveys and known sensitive plant populations are mapped and documented. It was queried to determine where populations of sensitive plants are known within and adjacent to the project planning area.

Botanical surveys for this project were conducted according to standard Forest Service procedures for conducting biological evaluations (USDA Forest Service Manual section 2670-Wildlife, Fish, and Sensitive Plant Habitat Management 1995). Surveys were done using the intuitive control technique. This means that large areas are surveyed, with emphasis on searching special habitats. At the time of the surveys, individual activity units, proposed riparian restoration, and road work was not yet delineated, so surveys were not done in all proposed vegetation management units, nor were all specific road work areas surveyed. Selected high probability areas with potential for ground disturbance would be surveyed before project implementation. If any sensitive plants are found, mitigations for protection will be developed.

#### 3.10.2.2 Alternative 1 – No Action

##### *Direct and Indirect Effects*

Alternative 1, the no action alternative, does not propose any new activities in the project planning area. Therefore, if the no action alternative were selected, there would be no direct or indirect effects to sensitive plant species, culturally significant plant species, or potential habitat in the short-term. There is no quantitative monitoring information or published studies that clearly indicate what the long-term effects of fire suppression and natural succession are for any of the sensitive plants that may occur in the project planning area. It would therefore be speculative to try to determine what the long-term effects of no action would be on sensitive plants. Therefore, the overall call for the no action alternative for all sensitive plants that may occur in the project planning area is no impact (NI).

##### *Cumulative Effects*

Because no management would occur, there would be no proposed action effects to add to ongoing or future actions that would contribute cumulative effects.

### 3.10.2.3 Alternative 2 – Proposed Action

*Direct and Indirect Effects*

There are no known populations, or potential habitat, for any federally listed, or proposed, plant species in the project planning area. White bark pine (*Pinus albicaulis*) is a candidate for federal listing. There are no known populations or potential habitat for this species in the project planning area. Therefore, implementation of the proposed action would have no effect to any federally listed, proposed, or candidate plant species.

Project design criteria and buffers around known populations of sensitive plants would protect all known populations of sensitive plants in the project planning area from ground disturbing activities. Some populations may be subject to prescribed burning. Project design criteria state that a botanist would be consulted before burning occurs in areas with known sensitive plant populations. These protections should ensure that there are no direct or indirect effects from project activities to the known populations. Therefore, there would be no impact to documented populations of sensitive plants from project activities associated with the proposed action.

Project design criteria would prohibit or minimize ground disturbance in special habitat areas. Prescribed fire would be relatively low intensity in lithosols, sagebrush shrublands, grasslands, cliffs, rock outcrops, and talus. Therefore, there would be no impact (NI) to the above listed special habitats and undocumented populations that may occur in those habitats from activities associated with the proposed action.

Activities in coniferous forests, aspen stands, and riparian dependent communities may potentially, directly and indirectly, affect habitat and undiscovered populations of sensitive plants. Potential detrimental direct effects include the destruction of sensitive plants from ground disturbance associated with cutting of trees, yarding trees, piling slash, or scattering slash. Prescribed fire or slash pile burning could scorch sensitive plant individuals within the fire area, and also may kill plants under and directly adjacent to slash piles. Fireline construction has the potential to directly kill or dislodge sensitive plants in the area that is denuded. Indirect effects could result from altering the hydrologic regime and changing light intensity. Vegetation management may also alter the interaction of herbivores and plants. By opening the forest canopy, grasses and other palatable plants may increase. This may lead to increased ingestion and trampling of sensitive plants from ungulates.

Construction of hiking and bicycle trails may potentially negatively impact undiscovered populations of sensitive plants. Plants could be uprooted and destroyed during construction and by trampling by bicycles and hikers. Potential indirect negative effects of new bicycle trails include increased use by cattle and motorcyclists and the introduction and spread of non-native invasive plants. Road construction, maintenance, and decommissioning all have the potential to cause direct negative impacts to sensitive plants. These negative impacts include direct destruction and indirect impacts due to changes in cattle movements, motorized access, and non-native invasive plant introduction and spread.

Project design criteria would reduce the risk of detrimental effects, but would not entirely eliminate the possibility of effects to habitat and undiscovered populations in these habitat types. None of the sensitive plant species that may occur in coniferous forest, aspen, and riparian dependent habitats on the Malheur National Forest is extremely rare on a global scale. Therefore, even if project activities may negatively affect individual plants or habitat, implementation of alternative 2 should not increase the need for Federal listing of any sensitive species.

For alternative 2, the determination of effects for forested communities, aspen, and riparian dependent habitats and associated sensitive plants is may impact individuals or habitat (MIIH), but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species. In the case of aspen enhancement, since the aspen stands would be rejuvenated and protected from grazing, implementation of the proposed action should have a beneficial impact (BI) to sensitive plant species that may occur there in the long-term.

Because culturally significant plants are not tracked or mapped, it is difficult to assess the effects to these species from proposed activities. Many of these plants occur in unique habitats such as lithosols, wet meadows, or ephemerally wet areas. The project design criteria that protect these unique habitats would help to protect the long-term viability of these species. Treatments that will reduce the chances of high-intensity fire should help to prevent the death of plants from excess heat. Conversely, some species may actually be helped by the removal of competition and the nutrient flush that is associated with fire in the environment.

#### *Cumulative Effects*

It is likely that historical activities, such as grazing, timber harvest, mining, road construction, and fire suppression, have destroyed populations and altered habitats for sensitive plants. These historical effects are not quantifiable. Climate change effects may be considered as a component of cumulative effects. Changes in climate influence vegetation, water, and disturbance frequencies, and these changes, in turn, influence one another. Attempts to quantify the degree of change would be speculative.

Since 1990, protection and management of sensitive species and their habitats (in the form of project design criteria, avoidance, or other mitigation) have been included in the design of all projects. This has reduced, and would continue to reduce, the potential of cumulative effects to sensitive plant populations and habitats.

The potential for detrimental direct and indirect effects to these habitats from the proposed activities have been minimized through the use of project design criteria. There are no current plans to conduct vegetation management activities in this area beyond the scope of this project for the next 10 years. Therefore, this project combined with foreseeable future projects, and those that have occurred in the recent past, are not likely to contribute to any cumulative adverse effects to sensitive plants.

### 3.10.2.4 Alternative 3

#### *Direct and Indirect Effects*

Alternative 3 proposes similar activities as alternative 2. Alternative 3 proposes more activities than alternative 2. The main difference is related to the number of acres proposed for commercial and non-commercial thinning (more of each in alternative 3). In addition, in alternative 3, much more biomass may be removed, and nearly twice as many bicycle trails would be constructed. The potential effects to sensitive plants and habitats are therefore proportionally greater for alternative 3 compared to alternative 2.

Project design criteria and buffers around known populations of sensitive plants would protect all known populations of sensitive plants in the project planning area from ground disturbing activities. Some populations may be subject to prescribed burning. Project design criteria state that a botanist would be consulted before burning occurs in areas with known sensitive plant populations.

These protections should ensure that there would be no direct or indirect effects from project activities to the known populations. Therefore, there would be no impact (NI) to documented populations of sensitive plants from project activities associated with the implementation of alternative 3.

The potential for negative effects to non-forested dry upland communities is similar to alternative 2. Since these habitats would be protected by project design criteria, there should be no impact (NI) to these habitats, or to any sensitive plants that may occur.

The potential effects to forest and riparian dependent communities would be greater for alternative 3 than for alternative 2. This is mostly because more acres are proposed for silvicultural activities. This increased risk of negative impacts is not enough to change the determination call for these habitats, and any sensitive plants that may occur there. Therefore, for alternative 3 the determination of effects for forested communities, riparian dependent communities, and any sensitive plants that may occur in those communities is may impact individuals or habitat (MIIH), but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species. The potential affect to culturally significant plants from this alternative would be similar to those from alternative 2.

#### *Cumulative Effects*

Cumulative effects for alternative 3 would be essentially the same as for alternative 2. All of the past and potential future activities are the same between the two alternatives.

### 3.10.2.5 Alternative 4

#### *Direct and Indirect Effects*

Alternative 4 proposes fewer activities than alternative 2; the main difference is related to the number of acres proposed for commercial and non-commercial thinning (less of each in alternative 4). In addition, in alternative 4 less biomass may be removed and fewer bicycle trails would be constructed. The potential effects to sensitive plants and habitats are therefore proportionally less for alternative 4 compared to alternatives 2 or 3.

Project design criteria and buffers around known populations of sensitive plants would protect all known populations of sensitive plants in the project planning area from ground disturbing activities. Some populations may be subject to prescribed burning. Project design criteria state that a botanist would be consulted before burning occurs in areas with known sensitive plant populations. These protections should ensure that there would be no direct or indirect effects from project activities to the known populations. Therefore, there would be no impact (NI) to documented populations of sensitive plants from project activities associated with the implementation of alternative 4.

The potential for negative effects to non-forested dry upland communities is similar to alternative 2. Since these habitats would be protected by project design criteria, there should be no impact (NI) to these habitats, or to any sensitive plants that may occur.

The potential effects to forest and riparian dependent communities would be less for alternative 4 than for alternatives 2 or 3. This is mostly because fewer acres are proposed for silvicultural activities. The decreased risk of negative impacts is not enough to change the determination call for these habitats, and any sensitive plants that may occur there.

Therefore, for alternative 4 the determination of effects for forested communities, riparian dependent communities, and any sensitive plants that may occur in those communities is may impact individuals or habitat (MIIH), but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species. The potential affect to culturally significant plants from this alternative would be similar to those from alternative 2.

#### *Cumulative Effects*

Cumulative effects for alternative 4 would be essentially the same as for alternative 2. All of the past and potential future activities are the same between the two alternatives.

### 3.10.2.6 Overall Summary of Effects to Sensitive Plants

Although there is a small chance of negative effects to sensitive plant species from the action alternatives, the potential of negative effects is relatively small. All known populations of sensitive plants will be buffered from all activities (except burning). The acres of potential habitat that are proposed for treatment are a relatively small percentage of the potential habitat for sensitive plants species throughout their range. Therefore, although the project may negatively affect individuals and habitats for sensitive plants, implementation of any action alternative should not result in a contribution towards a trend toward federal listing of any sensitive plant species. The selection of any action alternative should not lead to a reduction in the long-term viability of any sensitive plant species on the Malheur National Forest (see Table 115).

**Table 115. Sensitive plant species occurrence in the project planning area and effects calls**

| Scientific name | Common name | Occurrence in planning area[1] | Effects calls[2] all action alternatives |
|---|---|---|---|
| **Fungi** | | | |
| *Albetrellus avellaneus* | Avel's albatrellus polypore | Suspected | MIIH |
| *Pseudorhizina californica* | umbrella false morel | Suspected | MIIH |
| **Lichen** | | | |
| *Texosporium sancti-jacobi* | woven spore lichen | Suspected | NI |
| **Liverwort** | | | |
| *Anastrophyllum minutum* | tiny notchwort | Suspected | MIIH |
| *Anthelia julacea* | alpine silverwort | Suspected | MIIH |
| *Barbilophozia lycopodioides* | giant fourpoint, maple liverwort | Suspected | MIIH |
| *Harpanthus flotovianus* | great mountain flapwort | Suspected | MIIH |
| *Jungermannia polaris* | Arctic flapwort | Suspected | MIIH |
| *Lophozia gillmanii* | Gillman’s pawwort | Suspected | MIIH |
| *Peltolepis quadrata* | shieldscale liverwort | No Habitat | NI |
| *Preissia quadrata* | blister ribbon | Suspected | MIIH |
| *Ptilidium pulcherrimum* | blunt water moss, worm moss | Suspected | MIIH |
| **Moss** | | | |
| *Bryum calobroides* | Bryum moss | Suspected | MIIH |
| *Encalypta brevipes* | candle snuffer moss, stubby extinguisher moss | Suspected | MIIH |

| Scientific name | Common name | Occurrence in planning area[1] | Effects calls[2] all action alternatives |
|---|---|---|---|
| *Entosthodon fascicularis* | banded cord moss, Hasselquist's hyssop | Suspected | MIIH |
| *Helodium blandowii* | blandow's feather moss, wet plume moss | Suspected | MIIH |
| *Meesia uliginosa* | Meesia moss | Suspected | MIIH |
| *Pseudocalliergon trifarium* | blunt water moss, worm moss | Suspected | MIIH |
| *Schistidium cinclidodonteum* | schistidium moss | Suspected | MIIH |
| *Schistostega pennata* | schistostega moss | Suspected | MIIH |
| *Splachnum ampullaceum* | purple-vased stink moss, small capsule dung moss | Suspected | MIIH |
| *Tetraphis geniculata* | tetraphis moss | Suspected | MIIH |
| *Tomentypnum nitens* | tomentypnum moss | Suspected | MIIH |
| *Tortula mucronifolia* | mucron-leaf tortula moss | Suspected | MIIH |
| **Vascular plants** | | | |
| *Achnatherum hendersonii* | Henderson's ricegrass | Suspected | NI |
| *Achnatherum wallowaense* | Wallowa ricegrass | Suspected | NI |
| *Artemisia arbuscula* ssp. *longicaulis* | Lahontan sagebrush | No Habitat | NI |
| *Astragalus tegetarioides* | Deschutes milk-vetch | No Habitat | NI |
| *Botrychium ascendens* | upward-lobed moonwort | Suspected | MIIH |
| *Botrychium crenulatum* | crenulate moonwort | Documented | MIIH |
| *Botrychium hesperium* | western moonwort | Suspected | MIIH |
| *Botrychium lineare* | slender moonwort | Suspected | MIIH |
| *Botrychium lunaria* | common moonwort | Suspected | MIIH |
| *Botrychium montanum* | mountain moonwort | Suspected | MIIH |
| *Botrychium paradoxum* | twin-spiked moonwart | Suspected | MIIH |
| *Botrychium pedunculosum* | stalked moonwort | Suspected | MIIH |
| *Bupleurum americanum* | American thorough-wax | No Habitat | NI |
| *Calochortus longebarbatus* var. *peckii* | Peck's long-bearded sego-lily | No Habitat | NI |
| *Calyptridum roseum* | rosy calyptridium | Suspected | MIIH |
| *Carex atrosquama* | brass-fruit sedge | No Habitat | NI |
| *Carex cordillerana* | cordilleran sedge | Suspected | MIIH |
| *Carex diandra* | lesser panicled sedge | Suspected | MIIH |
| *Carex idahoa* | Idaho or Parry's sedge | No Habitat | NI |
| *Carex lasiocarpa* | slender woolly sedge | Suspected | MIIH |
| *Carex media* | Scandinavian sedge | No Habitat | NI |
| *Carex micropoda* | timberline sedge | No Habitat | NI |
| *Carex nardina* | spikenard sedge | No Habitat | NI |
| *Carex pelocarpa* | dusky seed sedge | No Habitat | NI |

| Scientific name | Common name | Occurrence in planning area[1] | Effects calls[2] all action alternatives |
|---|---|---|---|
| *Carex retrorsa* | retrorse sedge | Suspected | MIIH |
| *Carex saxatilis* | limestone or russet sedge | No Habitat | NI |
| *Carex scirpoidea* ssp. *stenochlaena* | Alaskan single spiked sedge | Suspected | MIIH |
| *Carex subnigricans* | dark mountain sedge | No Habitat | NI |
| *Carex vernacula* | foetid or native sedge | No Habitat | NI |
| *Chaenactis xantiana* | desert chaenactis | No Habitat | NI |
| *Cheilanthes feei* | Fee's lip-fern | No Habitat | NI |
| *Cryptogramma stelleri* | Steller's rock-brake | No Habitat | NI |
| *Cymopterus nivalis* | snowline cymopterus | No Habitat | NI |
| *Cypripedium fasciculatum* | clustered lady's slipper | Suspected | MIIH |
| *Elatine brachysperma* | short-seeded waterwort | Suspected | MIIH |
| *Eleocharis bolanderi* | Bolander's spike-rush | Documented | MIIH |
| *Eremothera pygmaea* | dwarf evening primrose | Suspected | MIIH |
| *Eriogonum cusickii* | Cusick's buckwheat | No Habitat | NI |
| *Eriogonum salicornioides* | playa or saltwort buckwheat | No Habitat | NI |
| *Heliotropium curassavicum* | salt heliotrope | No Habitat | NI |
| *Kobresia myosuroides* | Bellard's kobresia | No Habitat | NI |
| *Listera borealis* | northern twayblade | Suspected | MIIH |
| *Lomatium erythrocarpum* | red-fruited desert parsley | No Habitat | NI |
| *Luina serpentina* | colonial luina | No Habitat | NI |
| *Lupinus cusickii* var. *cusickii* | Cusick's lupine | No Habitat | NI |
| *Lycopodium complanatum* | ground-cedar | Suspected | MIIH |
| *Mimulus evanescens* | disappearing monkey-flower | Suspected | MIIH |
| *Muhlenbergia minutissima* | annual or little-seed muhly grass | Suspected | MIIH |
| *Ophioglossum pusillum* | adder's-tongue | Suspected | MIIH |
| *Pellaea bridgesii* | Bridge's cliff-brake | Suspected | NI |
| *Phacelia minutissima* | dwarf or least phacelia | Suspected | MIIH |
| *Phlox hendersonii* | Henderson's phlox | No Habitat | NI |
| *Phlox multiflora* | many-flowered phlox | Suspected | MIIH |
| *Pilularia americana* | American pilwort | Suspected | MIIH |
| *Pinus albicaulis* | whitebark pine | No Habitat | NI |
| *Pleuropogon oregonus* | Oregon semaphore grass | Suspected | MIIH |
| *Potamogeton diversifolius* | diverse-leaved pondweed | Suspected | MIIH |
| *Rotala ramosior* | lowland toothcup | Suspected | MIIH |
| *Salix farriae* | Farr's willow | No Habitat | NI |
| *Salix wolfii* | Wolf's willow | No Habitat | NI |

| Scientific name | Common name | Occurrence in planning area[1] | Effects calls[2] all action alternatives |
|---|---|---|---|
| *Saxifraga adscendens* ssp. *oregonensis* | wedge-leaved saxifrage | No Habitat | NI |
| *Stanleya confertiflora* | biennial stanleya | No Habitat | NI |
| *Thelypodium eucosmum* | arrow-leaved thelypody | No Habitat | NI |
| *Trifolium douglasii* | Douglas' clover | Suspected | MIIH |
| *Trollius albiflorus* | American globeflower | Suspected | MIIH |
| *Utricularia minor* | lesser bladderwort | Suspected | MIIH |

[1] Project planning area occurrence: Documented = Species is documented in the project planning area; Suspected = Potential habitat present, and species is suspected to occur in project planning area; and No Habitat = No potential habitat present, species not expected in project planning area

[2] Effects calls: NI = No impact, the species does not occur in project area, and/or activities will not impact populations; MIIH = May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species; WIFV = Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species; and BI = Beneficial impact.

### 3.10.2.7 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

#### *National Environmental Policy Act*

The botanical specialist report and biological evaluation for this project fulfills, in part, requirements of the National Environmental Policy Act of 1969 which directs federal agencies to "... insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken" [40 CFR §1500.1(b)], and to ensure that the applicable standards and guidelines of Malheur Forest Plan are included in the project design. The Botanical Resource Report and Biological Evaluation disclose the existing condition of sensitive plant populations and habitats, and analyze the potential effects to these resources.

#### *Endangered Species Act and Forest Service Sensitive Species Policy*

The Botanical Resource Report and Biological Evaluation for this project analyze potential effects to federally listed, proposed, and candidate plant species. It also analyzes potential effects to plant species designated as sensitive on the most recent Region Six Regional Forester's Special Status Species List (USDA Forest Service 2011).

#### *Malheur National Forest Land and Resource Management Plan*

The Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan) does not specifically outline any goals or desired future conditions for sensitive plants.

Under Fish and Wildlife, two goals may be interpreted to include plants (USDA Forest Service 1990a, page IV-2):

- Goal #15. Assist in the identification, protection, and recovery of threatened, endangered, and sensitive species.
- Goal #19. Provide a diversity of habitat sufficient to maintain viable populations of all species.

Malheur Forest Plan objectives under Fish and Wildlife may be interpreted to include plants (USDA Forest Service 1990a, pages IV-16 and IV-17):

- Plan and design all management activities to avoid actions that may cause a species to become threatened or endangered. Critical habitats and other habitats necessary for the conservation of these species would not be destroyed or suffer adverse modification.
- Cooperate with future recovery efforts on behalf of the bald eagle, American peregrine falcon, and other threatened, endangered, or sensitive species. Consult with the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, the Oregon Department of Agriculture, and the Natural Heritage Foundation for technical assistance in developing management guides and in determining viable population levels.
- Manage habitat of candidate species for listing as threatened or endangered in cooperation with the U.S. Fish and Wildlife Service. Monitor known populations and survey for additional populations with the cooperation of The Nature Conservancy and the Oregon Natural Heritage Database (now called the Oregon Biodiversity Information Center).

The Malheur Forest Plan standard for Unique and Sensitive Habitats (microhabitats) would help protect potential rare plant habitat (USDA Forest Service 1990a, page IV-31):

- Standard #56. Maintain the integrity of unique habitats including meadows, rim rock, talus slopes, cliffs, animal dens, wallows, bogs, sees and springs by incorporation cover buffers approximately 100 feet in width. Utilize additional mitigation/enhancement measure identified through project level analysis.

Malheur Forest Plan forest-wide standards for threatened, endangered and sensitive species include (USDA Forest Service 1990a, pages IV-32 and IV-33):

- Standard #62. Meet all legal and biological requirements for the conservation of threatened and endangered plants and animals. Assess all proposed project that involve habitat change or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species.
- Standard #64. When threatened or endangered species or habitats are present, follow the required biological assessment process, according to the requirements of the Endangered Species Act (Public Law 93-205). Meet all consultation requirements with the USDI Fish and Wildlife Service and state agencies.
- Standard #65. Specify all protection or mitigation requirements (36 CFR 219.27(a) *8)) before project implementation begins. Manage all habitats for existing federally classified threatened and endangered species to help achieve recovery objectives.
- Standard #66. Perform a biological (field) evaluation for use in planning of proposed projects when sensitive species are present or suspected. Conduct surveys in cooperation with other agencies and groups to document the locations of sensitive species populations and to provide more specific information on habitat requirements and relative management guidelines.

All project design criteria and project proposals for all action alternatives comply with the above listed laws and Forest Service regulations. All proposed project activities are consistent with the applicable Malheur Forest Plan standards and guidelines.

# 3.11 Analysis Issue – Invasive Plants

## 3.11.1 Existing Condition

Fourteen different types of invasive plant species are known to occur within the Magone project planning area. These species are listed in Table 116 along with their scientific name and approximate acres of infestation. Most of the species located within the project planning area are "A" rated species, which are normally limited in distribution throughout the state. Eradication, containment, rejection, or other holding actions are the most common actions to be taken on these species. A comprehensive site-specific inventory for non-native invasive plants has not been done in this project planning area. There are undoubtedly many undocumented acres and potentially additional species of non-native invasive plants in the project planning area.

**Table 116. Known non-native invasive plant occurrence and abundance within the Magone project planning area**

| Common name | Scientific name | Total acres |
|---|---|---|
| Bull thistle | *Cirsium vulgare* | 3.58 |
| Canada thistle | *Cirsium arvense* | 12.03 |
| Cheatgrass | *Bromus tectorum* | 3.68 |
| Common mullein | *Verbascum thapsus* | 0.92 |
| Dalmatian toadflax | *Linaria dalmatica* | 2.71 |
| Diffuse knapweed | *Centaura diffusa* | 1.88 |
| Hardheads | *Acroptilon repens* | 0.21 |
| North Africa grass | *Ventenata dubia* | 0.17 |
| Oxeye daisy | *Leucanthemum vulgare* | 0.02 |
| Scotch thistle | *Onopordum acanthium* | 0.46 |
| Spotted knapweed | *Centaurea stoebe* ssp. *micranthos* | 60.78 |
| St. Johnswart | *Hypericum perforatum* | 0.67 |
| Stinking willie | *Senecio jacobaea* | 0.10 |
| Sulphur cinquefoil | *Potentilla recta* | 3.86 |

The invasive plants within the project planning area encompass approximately 91 acres (0.33 percent) of the project planning area.

Invasive plant spread on the Malheur National Forest has occurred largely due to past and ongoing activities, which can increase the likelihood of weed spread. Additionally, invasive plants can spread from the following activities:

- Seeds becoming attached to fur of wildlife and domestic livestock as they pass through existing infestations and then fall off at another location.
- Seeds and weed propagules being transported by vehicles and machinery that have been operated in infested areas.
- Management actions that disturb soils and reduce competing vegetation, making more desirable sites for invasive/noxious weed establishment.
- Ingestion of seeds by animals followed by defectation away from the original infestation.

- Prescribed burning and actions associated with creation and burning of slash piles.

In addition to the above vectors, invasive plants can spread through natural vectors such as wind fire, and water.

## 3.11.2 Environmental Consequences

### 3.11.2.1 Indicators for Assessing Effects

The measurement indicator for assessing effects from non-native invasive plants is the risk of spread from ground disturbance.

### 3.11.2.2 Methodology

Several methods were used to determine the existing condition of invasive plants and to determine the expected effects of each alternative. The state of Oregon weed list and the Grant County weed list were reviewed to identify known invasive plants of concern in the general area. A Geographic Information System map was reviewed showing the existing known invasive plant infestations in the project planning area.The data on this map came from surveys on the Forest recently performed by the Forest Service; additionally, the range specialist also performed ongoing visual monitoring of the project planning area to identify expansions of known sites and look for introduction of new species. All documented invasive plant sites from these surveys are recorded in a national database, Natural Resources Information System. The database includes individual site records indicating the location, size of infestation, plant numbers and density, type of past treatment implemented, recommended follow-up treatments and effectiveness.

#### *Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

Past and ongoing actions such as timber sales, road construction and maintenance, fire suppression, livestock grazing, big game wildlife, and recreational uses (refer to Chapter 3 for further information regarding these activities) have introduced invasive plant populations to the project planning area.

Foreseeable activities occurring within the project planning area would provide a moderate to high probability of the introduction and spread of invasive plants. Foreseeable activities include (but are not limited to) use and maintenance of Forest roads, fire suppression, livestock grazing, slash piling and burning, firewood cutting, and year-round recreational use.

The Forest’s invasive plant management program consisting of annual surveys combined with mechanical and hand pulling treatments would continue. The amount of treatment within the project planning area would vary annually based on funding and Forest priorities. With the approval of the Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015b), additional invasive plant treatments (potentially including the use of herbicides) may occur in the Magone project planning area.

### 3.11.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

Under this alternative, there would be no change to the existing rate of spread, nor a change in the introduction of new species from the current rate. Minor changes in spread occur where invasive plants are found along roads and where bare ground found or created as a result of wildfire, both naturally occurring and human caused. Monitoring and control for invasive plants conducted by the forest would continue to occur.

#### *Cumulative Effects*

There would be no additive effects that would contribute to the spread of invasive plants under the no action alternative. Cumulative effects that are likely to occur in alternative 1 include the reduction in invasive plants with implementation of the Record of Decision for the Malheur National Forest Site-Specific Invasive Plants Treatment Project (USDA Forest Service 2015b). This document may authorize the use of herbicides for treatment of invasive species on the Forest.

### 3.11.2.4 Alternatives 2, 3, and 4

#### *Direct and Indirect Effects*

**Silviculture treatments** that cause ground disturbance would increase the risk for spread and introduction of invasive plants. If seeds were introduced to these disturbed areas they can germinate more readily than if the soil surface was intact (Gelbard and Belnap 2003; Silveri et al. 2001). The invasive plant seed could come from a nearby invasive plant patch, be transported by soil clinging to equipment or be introduced from some other source (birds, animals, recreation). Contractors mobilizing equipment from other areas have the potential to introduce invasive plants within harvested areas and along existing access roads. This effect can be greatly limited by ensuring that machines do not travel from invasive plant patches to areas without invasive plants. Additionally, this effect can also be minimized by ensuring that bare ground created as a result of this action is limited and not continuous such that a stand of invasive plants could become established.

**Prescribed burning** may increase invasive plant populations (Briese 1996; Maret and Wilson 2000). Burned areas provide nutrients and space for invasive plants to establish. A monitoring study done on the Forest noted that an increase in invasive plants was closely related to the intensity of a fire. Lower intensity fires had fewer invasive plants develop in the area (Kerns et al. 2006). Therefore, since low intensity fires are proposed in the project planning area, invasive plants would not be expected to increase at a rate greater than that of the no action alternative.

**Riparian restoration activities** that create bare ground would increase the risk for spread and introduction of invasive plants. Specifically, in riparian areas where water is abundant, the spread of invasive plants is a risk. Once invasive plants are established in riparian areas there are few successful treatment options currently available to the Forest. Additionally, invasive plants established within riparian areas spread at a much faster rate given the availability of resources and become a problem for the resource in a short period of time.

**Recreation opportunity improvements** proposed are likely to increase the spread of invasive plants. Invasive plant locations are commonly found along roads and trails within this project planning area. The increased activity along these roads and trails from the proposed increase in recreation is likely to increase the spread of invasive plants to locations that currently are un-altered by their species.

**Magone Lake Restoration activities** are not likely to increase the spread of invasive plants within the project planning area.

**Roads activities** proposed in the project planning area are likely to be the largest contributor to the spread of invasive plants. The majority of the invasive plants on the Forest are concentrated along the Forest road system. This is likely due to several factors including; the high use of the roads that transport the invasive plants, the preferable seedbed created by road gravels, and the continual disturbance of the road surface. As such, activities that create new disturbed ground adjacent to or within the road prism or further disturb the road surface would be likely to spread invasive plants. Road maintenance, new road construction, road decommissioning and temporary road construction all disturb soil to some degree.

*Cumulative Effects*

The action alternatives have the potential to increase the spread and introduction of invasive plants during treatment. However, with the proper mitigation measures in place; continued diligence towards minimizing bare ground, eradicating new invasive plant sites, minimizing potential invasive plant sources such as unclean machinery, and reseeding when bare ground is created, the amount and extent of cumulative effects can remain minimal. With the proper mitigation the adverse effects would remain unmeasurable. Cumulative effects that are likely to occur with implementation of the action alternatives include the reduction in invasive plants with implementation of the Record of Decision for the Malheur National Forest Site-Specific Invasive Plants Treatment Project (USDA Forest Service 2015b). This document may authorize the use of herbicides for treatment of invasive plant species on the Forest.

#### 3.11.2.5 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All alternatives are consistent with the Forest-wide standards for invasive plants, including forest plan modifications made by the Pacific Northwest Region Invasive Plant Program Final Environmental Impact Statement and Record of Decision (USDA Forest Service 2005a).

## 3.12 Analysis Issue – Range

The authority to protect, manage, and administer the National Forest System lands and other lands under Forest Service administration for range management purposes is found in the following two acts:

- Multiple Use Sustained Yield Act, 1960 established the policy and purpose of national forests to provide for multiple use and sustained yield of products and services.
- Forest and Range Renewable Resources Planning Act, 1974 established public land policy and guidelines for management, protection, development, and enhancement of public lands.

The Malheur Forest Plan, as amended, provides general direction, objectives, and goals for the management of forest resources (USDA Forest Service 1990a, page IV–2) including:

- Provide a sustained production of palatable forage for grazing by livestock and dependent wildlife species (Forest Goal 20).
- Manage rangelands to meet the needs of other resources and uses at a level that is responsive to site-specific objectives (Forest Goal 21).
- Permit livestock use on suitable range when the permittee manages livestock using prescribed practices (Forest Goal 22).

The Malheur National Forest Post-Fire Grazing Interim Guidelines (USDA Forest Service 2003) is an interim guide providing direction that establishes minimum timeframes an area would be rested from grazing following a wildfire or prescribed fire.

### 3.12.1 Existing Condition

Within the project planning area there are a total of nine grazing allotments: John Day, Beech Creek, Roundtop, Keeney Meadows, Dixie, Fox, Long Creek, Herberger, and McCullough (Table 117). Seven of the allotments currently have 10-year term grazing permits (

Table 118).

**Table 117. Allotments in the Magone project planning area**

| Allotment | Total acres | Acres within project planning area | Percentage of allotment within project planning area |
|---|---|---|---|
| John Day | 18,629 | 11,992 | 64% |
| Beech Creek | 3,913 | 1,011 | 26% |
| Roundtop | 13,707 | 12,398 | 90% |
| Keeney Meadows | 450 | 63 | 14% |
| Dixie | 26,874 | 64 | 0.24% |
| Fox | 26,220 | 49 | 0.19% |
| Long Creek | 49,000 | 68 | 0.14% |
| Herberger | 553 | 155 | 28% |
| McCullough | 627 | 478 | 76% |

**Table 118. Allotment livestock grazing numbers, animal unit months (AUMs), and permitted dates of use**

| Allotment | Livestock numbers (cow/calf pairs) | AUMs[17] | On date | Off date |
|---|---|---|---|---|
| John Day | 177 | 1,052 | 11-Jun | 5-Oct |
| Beech Creek | 35 | 304 | 15-May | 30-Nov |
| Roundtop | 200 | 1,059 | 1-June | 30-Sep |
| Keeney Meadows | 57 | 114 | 19-Jun | 3-Aug |
| Dixie | 173 | 1,028 | 1-Jun | 15-Oct |
| Fox | 293 | 997 | 11-Jun | 30-Sept |
| Long Creek | 967 | 3,246 | 1-Jun | 15-Oct |
| Herberger* | 8 | 26 | 1-Aug | 15-Oct |
| McCullough* | 33 | 174 | 1-Jun | 30-Sep |

*The Herberger and McCullough allotments are currently not authorized to graze.

The allotments within the project planning area contain diverse ecosystems including south facing slopes with grassland type environments that contain moderate amounts of Idaho fescue and bluebunch wheatgrass with a ponderosa pine/Douglas-fir over story; and meadow environments that were historically agricultural private land and/or used extensively by Civilian Conservation Corps crews during the 1930s to 1940s for the conservation and development of natural resources. Additionally, within these allotments there are upland Cool Moist plant associations comprising limited amounts of forage dominated by forbs and shrubs; and riparian ecosystems that are composed of sedges and rushes with an alder or willow dominant canopy.

Forage availability within most areas of the project planning area has decreased due to fire suppression activities and lack of recent timber harvest. The result is an increase in the timber canopy structure, which tends to reduce the amount of sunlight reaching the forest floor and reduces the amount of available forage.

Prior to European-American settlement of the area, fire played a dominant role in shaping the landscape. Forest Service fire suppression policies have significantly altered the ecosystem. Areas of open ponderosa pine stands have been converted to dense, overstocked, dead and dying stands of diseased forest that provide little in the way of forage for grazing animals. Conifers have encroached upon areas that were once open meadows and dry rangeland. Densely stocked forest stands have succumbed to insects and disease, and reduced vigor because of overcrowding. Where significant tree mortality has occurred, fallen trees restrict movement of wild ungulates and livestock, thereby further limiting the amount of forage available.

Native grass and forb species are still predominant in many areas of the dry forest type, however some areas have been mixed with non-native species (intermediate wheatgrass and Kentucky bluegrass) introduced to stabilize soils along roads, skid trails, and landing sites. Some of these same disturbed locations now host populations of invasive plants.

[17] Animal unit month (AUM): The amount of forage required by one mature (1,000 pound) cow or its equivalent for one month (based upon average forage consumption of 26 pounds of dry matter per day).

#### 3.12.1.1 Riparian Conditions within the Project Planning Area

Within the Magone project planning area the Forest Service interdisciplinary team annually collects riparian monitoring data for the amount of utilization by permitted livestock. Additionally, at regular intervals, the PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring Program collects data relating to the condition of the streams specifically relating to livestock use levels. This data indicates that livestock use of riparian areas has been within allowable levels for several years. As a result of continued acceptable use by livestock, the riparian areas have been able to recover from their historically poor condition.

#### 3.12.1.2 Upland Conditions within the Project Planning Area

In 1970, condition and trend monitoring of plant communities within the project planning area was completed. The results of this monitoring indicated that the condition of the vegetative community was "poor."

In 2014, the sites monitored in 1970 were re-monitored using the same protocol. The results of the most recent monitoring indicated the condition of the vegetative community was "Good – Excellent." See examples of the 1970 and 2014 monitoring photos in the Range Report.

*Upland Water Developments*

Throughout each allotment, a number of structural improvements are maintained by the permittees. These improvements include allotment boundary and pasture fences, small enclosure fences, and watering troughs and ponds. Fences on the allotments are maintained annually and troughs and ponds are maintained on an as needed basis, typically at least every 5 years.

There are 52 existing upland water developments within the project planning area, including 32 ponds, 19 water troughs, and 1 drinking water spring.

### 3.12.2 Environmental Consequences

#### 3.12.2.1 Indicators for Assessing Effects

The measurement indicators detailed in Table 119, and described above, are used for assessing the effects to rangeland resources in the Magone project planning area.

**Table 119. Range resource indicators and measures for assessing effects**

| Objective | Indicator | Justification |
|---|---|---|
| Availability of water developments to increase cattle distribution in the uplands | Upland water sources | USDA Forest Service 1990a |
| Assess changes to forage production | Forage production | USDA Forest Service 1990a |
| Assess changes to acres available for livestock grazing | Acres available for livestock grazing | USDA Forest Service 1990a |

#### 3.12.2.2 Methodology

This section provides basic rangeland resource information within the project planning area. Discussion regarding the project planning area is focused on the grazing allotments and their respective pastures for the purpose of addressing grazing permit administrative impacts or impacts to permittees.

Annual range vegetation monitoring has been conducted on the grazing allotments located within the project planning area. Range administration is conduced yearly by both the Forest Service and the permittees to meet terms and conditions of the grazing permit.

Other sources of information include:

- Grazing permits
- Malheur National Forest geographic information system (GIS) database
- Malheur National Forest Land and Resource Management Plan
- On-the-ground knowledge of the project planning area
- Conversations and field visits with permittees

*Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis*

Past actions in or near the project planning area include, but are not limited to, timber management, wildland fuels management, fire suppression, grazing, recreation, firewood cutting, road and facilities construction and maintenance, aquatic restoration, and increasing elk populations.

### 3.12.2.3 Alternative 1 – No Action

*Direct and Indirect Effects*

Current grazing practices would continue on all allotments within the project planning area. The no action alternative would have no overall direct short-term impacts to permittee operations.

Forage availability under the no action alternative is predicted to decrease over time due to the increased plant competition that occurs when overstory shading from trees increases. Decreases in forage availability would likely affect livestock distribution within the allotments. Additionally, under this alternative, it is expected that the increase in tree density would decrease the available water in springs, thus increasing the difficulty in managing livestock.

Under this alternative the existing forage base would continue to decline in vigor and abundance as tree canopy cover increases and becomes closed. Tight canopies reduce available sunlight on the forest floor, increase the duff layer, and reduce soil moisture and nutrients. Carrying capacity would decline as grasses, forbs, and shrubs are crowded out by shade-tolerant species, resulting in a reduction of available forage. If more suitable rangeland is not created by future management projects or natural disturbance, the number of livestock permitted to graze on this project planning area may need to be decreased in the future to avoid unacceptable environmental damage.

With the no action alternative no additional ground disturbance would occur, so grasses and grass-likes[18] are not as likely to be disturbed by invasive plants. Aspen stands would continue to degrade, as increased competition from evergreens crowds them out. Declining resource conditions and increased canopy cover would also favor larger high-intensity wildfires in the long-term. With more intense fire regimes, less palatable and/or non-native invasive species would increase. Invasive plants readily establish in high intensity burns and prevent re-establishment of native forage.

[18] Grasses are from the family Poaceae. Grass-likes are the variety of plants with long, narrow leaves that sheath the stem (like a grass). They resemble grasses or sedges, but do not have a perigynium (female part of the flower) like sedges, or flowers arranged in spikelets as in true grasses.

Under the no action alternative the existing spring developments and fence lines would require slightly more maintenance. Fence maintenance cost would increase as snag densities increase and fall into the fence right-of-way, thus needing to be removed. Increases in tree densities under this alternative would increase the difficulty for permittees to access spring developments and keep them in proper functioning condition.

With the no action alternative, no changes would be made in road densities that would impact permittee operations or access to improvements.

#### *Cumulative Effects*

The reasonable and foreseeable future activities in the project planning area include (but are not limited to) use and maintenance of Forest roads, fire suppression, livestock grazing, firewood cutting, aquatic restoration activities, and year-round recreational use. Cumulatively, the existing forage base would continue to decline in vigor and abundance, invasive species would increase, maintenance costs for fences may increase, and cattle and permittee access may decline.

Alternative 1 (no action) would not move the project planning area towards a healthier, resilient, diverse, and sustainable ecosystem. If no action were taken, forage quality and production would continue to decline, reducing the quantity of primary, secondary, and suitable rangeland over time. There would be a decreased likelihood that the area could be managed in the long-term toward open forest conditions, consistent with the historical range of variability. There would be a decrease in the likelihood that the area could continue to be managed in the long-term for multiple use, as prescribed by our agency mission, including livestock grazing.

### 3.12.2.4 Alternatives 2, 3, and 4

#### *Direct and Indirect Effects*

***Silviculture treatments***: Silviculture treatments would positively affect range conditions and increase available forage for livestock. Based on professional experience on the Malheur National Forest the proposed thinning and prescribed burning would have a positive effect for both the short- and long-term range conditions by reducing conifer density in stands, reducing ground fuel loadings that restrict livestock movement and increasing transitory range forage. Therefore, the alternatives can be expected to decrease the impacts of cattle grazing on riparian zones by providing cattle more suitable upland rangeland to use. Alternative 3 (which includes the greatest amount of silviculture treatment acres) would increase available forage the most for livestock, followed by alternative 2, and then alternative 4.

***Prescribed burning***: Prescribed fire that consumes light herbaceous material has a positive effect on range management. By burning decedent fuels, more plant material comes into contact with the soil surface, which increases the rate of decay of the material. This increase in decay allows the incorporation of organic matter into the soil, which increases the nutrients available to the plant as well as increasing the water holding capacity of the soil. All of these factors combine to increase forage production of a site. Short-term impacts from prescribed fire may occur; however, the effects are not expected to decrease the ability for permittees to effectively manage their allotments. Alternatives 2 and 3 (which include the greatest amount of prescribed burning) would increase available forage the most for livestock, followed by alternative 4.

The vegetation of the Blue Mountains is highly adapted to periodic fire in forest, shrub-land, and grassland ecosystems. Fire was once an integral function of the majority of ecosystems in northeast Oregon. The predominant vegetation would recover quickly after underburning and rest periods from grazing is not anticipated in most pastures, therefore impacts to permittee operations is not anticipated. Fuel treatment areas are predominately composed of elk sedge and pine grass. These fire tolerant herbaceous species are less desirable forage by livestock.

Advanced coordination with a District Range Specialist and permittees prior to prescribed burning activities is required (see Appendix C – Project Design Criteria). Grazing management adjustments would be developed in coordination with the allotment permittee and incorporated into the annual grazing strategies. After underburning is initiated, grazing management practices would be implemented to achieve desired use levels. These practices may include deferment or electric fencing, adjustment of livestock placement in pastures, and use of salt blocks or other management practices that would promote use by livestock in portions of the pasture away from treatment areas. The proposed actions are consistent with the Malheur National Forest Post-Fire Interim Grazing Guidelines (USDA Forest Service 2003) which states that vegetation types such as elk sedge and pine grass require little recovery time after a light burn.

Generally, spring burns have the fewest undesirable effects to forage species, perhaps due to higher soil moistures. However, bluebunch wheatgrass has a higher mortality if spring burned, compared to fall burning. In the elk sedge/pinegrass communities, low to moderate severity fire may result in rapid rhizome extension and greater palatability.

Burning impacts on plant species in this project planning area would vary in response to a variety of conditions such as the weather, season of burning, plant morphology, current plant condition and vigor, accumulated litter, soil moisture, and ultimately the fire intensity. Fire intensity is probably the most influencing factor that may affect individual plants and forage production. The wide variation in burning intensity across treatment units (unburned to light to moderate) would create wide variability in results and recovery. Low-intensity fires would have low plant mortality and stimulate plant vigor. Plants with increased vigor produce more leaf matter and set more seed resulting in an increase in forage production. Increased plant mortality is expected with heavier fuel loading. In these areas re-seeding with native plant seed mixes would be necessary.

Low-intensity burning is expected where fuel loads are mostly herbaceous, and there is very little woody material, less than 1 ton per acre as in open grassland with only light shrub cover. When prescriptions call for broadcast burning of scattered fuels, the burning impacts would be widespread over the unit, with severe burning intensity creating cover voids but with surviving plants interspersed throughout the unit. Bunched slash and piles burned at landings mean certain death for understory species and re-seeding would be necessary.

Long-term impacts of prescribed burning are anticipated to be positive in terms of moving treatment units towards the historical condition objective and improving both watershed values and production of rangeland resources. Burning “effects” include the release of nutrients which have been tied up in the system so that there is a stimulant (fertilizer affect) on the understory. Recovery of vigor and production in the herbaceous species is quickest for pine grass and elk sedge, and with low-intensity fires, dry site bluebunch wheatgrass and Idaho fescue should be stimulated by the defoliation. However, maintenance of historical conditions, long-term, would require more follow-up treatment so that shrub recovery may not reach pretreatment levels or dominate understories. Historical conditions on these sites probably did not have heavy shrub cover in many places since fire-return intervals thinned the shrub cover repeatedly.

Prescribed fire has an indirect effect of promoting better livestock distribution due to improved quality of forage. Indirect effects related to management of grazing permits include loss of control if gates are left open or fences are burned up. This causes loss of control of livestock, and resultant loss of effective management of the rangeland vegetation.

***Road activities***: During project implementation the increase in road activity would likely detrimentally affect cattle distribution. The extent of this effect is unpredictable and is based on several fluctuating factors that are largely controlled by the timing of the road activities in correlation with the effectiveness of the intensive management of livestock with the project planning area. This effect is expected only to last until the project is complete. Alternative 3 would have the greatest increase in road activity (with the greatest miles of road maintenance for haul and temporary road construction), followed by alternative 2, and then alternative 4 (with the least miles of road maintenance for haul and temporary road construction).

Access to much of the project planning area by permittees with livestock grazing permits is by means of horseback. As such, decreasing road densities would not negatively effect livestock management.

Permittees with term grazing permits are allowed limited off-road use in order to administer their grazing permits pursuant to Title 36 Code of Federal Regulations 261.5. In addition, any existing closed road that is needed for access for the administration of grazing permits within Malheur National Forest lands are available for use even if closed for use by the general public. Permittees exercise care and are cautious with their authorization as not to abuse their privilege in accordance with their term grazing permits. As such, the increase or decrease of open roads as proposed by the alternatives would likely not affect livestock management activities. Alternative 2 would have the most affect to the current road system (with the most road miles proposed for road closure), followed by alternatives 3 and 4.

***Recreation opportunity improvements***: Recreation may have a negative effect on range management. Recreation increases the chance of cattle being harassed and moved to areas were resources are more limited; areas were resources are being managed under stricter guidelines due to threatened species habitat; areas that are being rested, have already been grazed, or can be damaged by grazing (too sensitive to be grazed by livestock). Typically this occurs by gates being left open as access to recreational sites is increased. Additionally, it is anticipated that as trails are created, more types of transportation would use the trails, further increasing the likelihood for the harassment of livestock, gates being left open, and fences being cut for access.

All action alternatives include some extent of trail construction within the project planning area. It is expected that as this activity increases, negative effects to the range program and the ability to manage livestock properly would be realized. Alternative 3 would have the greatest impact (with the most miles of new trail construction and designation proposed), followed by alternative 2, and then alternative 4 (with the least miles of new trail construction and designation).

Specifically, livestock management within the project planning area is strictly regulated due to the presence of the threatened species steelhead and their critical habitat. The Malheur National Forest follows the grazing standards as listed in the Biological Opinion and Letters of Concurrence written by National Marine Fisheries Service and the U.S. Fish and Wildlife Service. In order to achieve successful livestock management in accordance with the current regulations, livestock are pushed and drawn to the ridgetops, away from the critical habitat and sensitive areas.

Typically, upland water sources have been developed in these areas and these areas are approved by the Forest Service as acceptable for the placement of livestock luring compounds such as low moisture blocks or high protein mineral tubs.

Many of the proposed trails are in the same locations used by livestock, in lieu of livestock using riparian areas along the critical habitat streams. As such, it is expected that the actions proposed in the alternatives, and likewise, the increase in the actions proposed, would likely decrease the Forest's ability to propose grazing strategies that encourage effective management of livestock away from steelhead critical habitat. Additionally, it is expected that the actions proposed in the alternatives, and likewise, the increase in the actions proposed, would likely decrease the permittees ability to effectively manage livestock away from steelhead critical habitat.

The recreational activity proposed in alternative 3 to designate OHV use on FSR 36 to 4 corners is not likely to have a negative effect on range management. FSR 36 is currently heavily traveled and thus the increase activity from OHV use compared to passenger vehicles is not expected to have a negative effect. There are no gates on that road that could be left open by OHV users and there is not likely to be concentrated livestock use in this area that may be harassed by OHV use.

There would be no impact to range management from the proposed accessible trail development (alternatives 2 and 3), placement of the day use boat dock (alternatives 2, 3, and 4), placement of the campground boat mooring (alternatives 2, 3, and 4), or placement of the fishing dock (alternatives 2 and 3) because these activities would take place within the Magone Lake recreation area, where grazing is restricted.

***Magone Lake restoration activities***: There would be no impact to range management from this activity because activities would take place within the Magone Lake recreation area, where grazing is restricted (which includes Magone Lake).

### *Cumulative Effects*

The action alternatives would move the project planning area towards a healthier, resilient, diverse, and sustainable ecosystem. The action alternatives would increase the amount of available forage for livestock as well as increase the amount of open area accessible by livestock. This increase in forage and space would lead to an overall decrease in the concentration of utilization of forage by livestock as well as wildlife. Combining more available forage with the current trend of increased conditions of vegetation in the project planning area may increase the options for forest land management to continue toward increased multiple use, as described in our agency mission.

The negative effects from increased recreation within the project planning area, as described in more detail above, would likely carry over to the areas surrounding the project planning area and have a negative effect on them as well. Recreation use within and between grazing allotments increase the chance of gates being left open and livestock assessing adjoining allotments. The domino effect of increased recreation would likely impede the forest's ability to continue to manage grazing allotments in a manner consistent with historic management.

***Fire suppression***: Fire suppression allows trees to increase canopy cover and thus decreases available forage on the forest floor, and has a negative effect on range management. Alternatively, uncontrolled wildland fire would have short-term negative effects to range management since the intensity can often sterilize soils and offer increased chances of invasive plant infestations due to the increased bare ground.

***Grazing***: Grazing has a beneficial effect to range management. Grass has evolved with grazing and is genetically designed to respond positively to the effects of grazing. Grass can be grazed after seed production as a way to increase the abundance of the species since grazing helps incorporate seeds into the soil through micro sites that are created by livestock hoofs. Grass can be grazed prior to seed emergence and, through the natural process of nutrient cycling, can be fertilized prior to seed production—the time in a plants maturity which take the most nutrients to complete.

***Firewood cutting***: Firewood cutting is a common activity that has a negative impact on range management. Fences are often cut, broken, or destroyed by people accessing trees. This allows livestock to access areas that have already been grazed, are too sensitive to be grazed, or are being protected for another resource.

***Aquatic restoration***: The effects of riparian restoration activities (authorized under the Aquatic Restoration Decision 2014) that involve the placement of woody debris within the riparian area is likely to detrimentally affect the amount of available forage for livestock within the project planning area. Furthermore, aquatic restoration activities that decrease the amount of available acres for livestock grazing would also have a detrimental effect to range management. These detrimental effects are expected to be balanced by the thinning activities within the project planning area. Thus, it is expected there would be a positive effect from aquatic restoration by decreasing livestock access to stream channels and thus increasing the amount of time that livestock are able to stay in a pasture. This is accompanied by a negative effect as well, in that the action can create ‘traps’ along the stream channel that hold cattle along the sensitive stream banks and can decrease the amount of forage availability and decrease the overall movement of livestock through a pasture/allotment.

#### 3.12.2.5 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All alternatives are consistent with the Forest-wide Standard 82: Manage residues to facilitate the use of forage by domestic livestock (USDA Forest Service 1990a, page IV-34).
Alternative 2 is consistent with the following Forest-wide Standards:

- Forest-wide Standard 85: Design improvements to protect tree regeneration and/or to distribute livestock use (USDA Forest Service 1990a, page IV-35).
- Forest-wide Standard 88: Design and implement structural and nonstructural range improvements to maintain productivity and range condition in addition to benefiting both wildlife and livestock. Locate range structural and nonstructural improvements to encourage livestock movement away from riparian areas (USDA Forest Service 1990a, page IV-35).

Range permittees were contacted during collaboration and the scoping period to solicit and incorporate comments on project activities.

# 3.13 Analysis Issue – Heritage

Cultural resources are fragile and irreplaceable resources that chronicle the history of people utilizing the forested environment. Cultural or heritage resources include:

- Historic properties, places which are eligible or potentially eligible for inclusion to the National Register of Historic Places (NRHP) by virtue of their historic, archaeological, architectural, engineering, or cultural significance. Buildings, structures, sites, and portable objects (e.g., signs, heavy equipment) may be considered historic properties. Traditional Cultural Properties (TCPs), localities that are significant in light of the role it plays in a community's historically rooted beliefs, customs, and practices (Parker and King 1998), are also considered historic properties. Historic properties are subject to the National Historic Preservation Act's Section 106 review process.
- American Indian sacred sites located on federal lands. These may or may not be historic properties.
- Cultural use of the natural environment (e.g., subsistence use of plants or animals), which must be considered under the National Environmental Policy Act (NEPA).

The effects analysis addresses the no action alternative and three action alternatives. The four alternatives should have no adverse effect on historic properties that are eligible or potentially eligible for inclusion to the NRHP.

## 3.13.1 Regulatory Framework

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Implementing regulations that clarify and expand upon the NHPA include 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), and 36 CFR 296 (Protection of Archaeological Resources).

The Pacific Northwest Region of the Forest Service, the Advisory Council on Historic Preservation (ACHP), and the Oregon State Historic Preservation Office (SHPO), signed a programmatic agreement regarding the management of cultural resources on National Forest system lands in 2004. The agreement outlines specific procedures for the identification, evaluation, and protection of cultural resources during proposed activities.

The NEPA is also a cultural resource management directive as it calls for agencies to analyze the effects of their actions on socio-cultural elements of the environment. Laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and Executive Order 13007 (Indian Sacred Sites) also guide Forest Service decision-making as it relates to heritage. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the impacts of their projects on the free exercise of traditional Indian religions.

The Malheur National Forest Land and Resource Management Plan (Malheur Forest Plan) (USDA Forest Service 1990a), as amended, tiers to the previously mentioned laws and corresponding Forest Service manual direction as it sets forth resource management goals, objectives, and standards. Forest-wide management standards that are pertinent for this project include:

- Conduct a professionally supervised cultural resource survey on National Forest lands to identify cultural resource properties. Use sound survey strategies and the Malheur National Forest Cultural Resource Inventory Survey Design. (USDA Forest Service 1990a, Standard 14, page IV-25)
- Consider the effects of all Forest Service undertakings on cultural resources. If a National Register and eligible property is affected, considerations shall include the formulation and analysis of alternatives, and the examination of interactions and impacts among cultural resources and other resource uses. Coordinate the formulation and evaluation of alternatives with the State cultural resource plan, the SHPO and State Archaeologist, other State and Federal agencies, and with traditional and religious leaders of Native American Indian groups and tribes with historic ties to the project planning area. (USDA Forest Service 1990a, Standard 15, page IV-26)
- Evaluate the significance of sites by applying the criteria for eligibility to the National Register of Historic Places. (USDA Forest Service 1990a, Standard 19, page IV-26)
- Protect National Register and eligible properties from human impacts and natural destruction. (USDA Forest Service 1990a, Standard 21, page IV-26)

### 3.13.2 Existing Condition

Under the National Historic Preservation Act (NHPA), the Area of Potential Effect (APE) for this undertaking includes the entire Magone project planning area, which covers an area of 27,087 acres within the Grub Creek and East Fork Beech Creek subwatersheds. Drainages in the area are tributaries to the John Day River, which ultimately empties into the Columbia River. The John Day River lies to the south of the project planning area and tributaries within the project planning area flow south to southeast from higher elevations until ultimately emptying into the John Day River.

The project planning area is located within the southern portion of the Blue Mountains physiographic province which is north of the High Lava Plains and Basin- Range physiographic provinces. The Owyhee Uplands lie to the south of the province while the High Lava Plains stretch to the west (Baldwin 1964). The topography of the area is characteristically mountainous with gentle to moderately steep slopes reaching up from the floor of the John Day River valley. Primary landforms include ridgetops, mountain slopes, and dissected canyons. Elevations vary from about 4,000 to 6,000 feet. Culturally important plant species, such as bitterroot, biscuitroot, yampa, lomatium, and huckleberries have been recorded in the area.

The history of the Magone project planning area is thematically rich. The area has been occupied by Native Americans for at least 10,000 years. The southern Blue Mountains were utilized by people representing the adaptive traditions of both the northern Great Basin and the Southern Columbia Plateau (Burtchard 1998). The area had seasonal use by the ancestors of the modern Cayuse, Nez Perce, Umatilla, Warm Springs and Northern Paiute tribes (Reid et al. 1989).

The Northern Paiute also utilized the area and developed a cultural pattern shaped by the demands of a semi-desert environment. During the spring, summer, and fall, small bands of Northern Paiute moved through the area collecting and gathering a wide range of food resources including seeds, plant foods, rabbit, fish, and antelope (Couture 1996). The Northern Paiute were divided into many bands and the project planning area lies within the Wada’ tika (meaning seed eaters) band territory. The Burns Paiute tribe is composed of people who are descendants of the Wada’ tika band (Couture 1996).

American Indian people procured tool stone from a variety of locations within and adjacent to the project planning area. The tool stone was used to create a variety of artifacts including knives, drills, scrapers, and projectile points. Groundstone tools used for plant processing have also been observed. Naturally occurring deposits of chalcedony, chert, petrified wood, and fine grained basalt are found in outcrops and in gravel bars. Obsidian was the most commonly used tool stone in the project planning area based on the artifacts encountered during surveys. The nearest obsidian sources are located approximately 20 miles to the southeast on the southern flanks of the Strawberry Mountains.

Non-native historic use of the project planning area has been relatively minor compared to American Indian use. Logging activities began on the Malheur National Forest in the late nineteenth century. Cattle ranching flourished in the region beginning in the 1860s. Sheep herding became large scale after the severe winters of the late 1880s devastated the cattle industry. Historic cabin sites, rock cairns, and log troughs all provide evidence for these past activities.

Federal land management of the Magone project planning area began with the creation of the Blue Mountain Forest Reserve in 1906, the precursor to the existing Malheur National Forest that was established two years later (Mosgrove 1980) to alleviate the increasing conflicts between cattlemen and sheep drovers. The Forest Service assigned A.S. Ireland as Forest Supervisor with oversight for the Western Division, which included the future Malheur National Forest with headquarters in Prineville. Ireland set out to resolve grazing issues by creating grazing districts and separating sheep and cattle allotments.

Early forest improvements included the addition of lookout towers, which were first suggested in 1912 in a letter from the District Forester to the Forest. The first tower was erected in 1916 on Strawberry Mountain (Mosgrove 1980). Many changes were initiated in regards to fire control policy from 1921 through 1939 (Mosgrove 1980).

Following the methodology discussed in Section 3.13.3.2, the predictive model was applied which divided the Magone project planning area into high, moderate, and low probability zones. The majority of the project planning area falls within low probability (18,284 acres) because of steep terrain. The model identified 3,113 acres of high probability, those areas with the greatest likelihood of locating archaeological sites. In general, sites previously identified are located within these high probability areas. They are predominately pre-contact lithic scatter sites. Lithic scatters are surface assemblages that contain debitage (waste flake from stone tool manufacturing) and/or formed stone tools (e.g., projectile points or bifaces) and occasionally ground stone. These sites range from very small lithic scatters, indicative of expedient tool manufacture or reworking, to large sites with heavy lithic concentrations, which could suggest heavy and long-term use. Diagnostic projectile points identified suggest that human use of the area began during the Early Holocene. Historic uses of the project planning area are primarily associated with livestock grazing and Forest Service administration.

There have been 37 cultural resource inventories previously conducted within the boundary of this project.

These surveys have resulted in the discovery of 45 heritage sites within the project planning area boundary and include 4 historic sites, 34 prehistoric sites, and seven sites with both historic and prehistoric components. One new pre-contact site and four isolated finds were recorded during surveys conducted in 2014. Twenty sites are deemed eligible for inclusion on the National Register of Historic Places, five sites are considered not eligible, and 20 remain undetermined.

Among the pre-contact and multicomponent sites, there are three lithic scatters sites that contain only debitage and 30 sites that contain debitage and formed stone tools. Seven additional time diagnostic projectile points were identified and described during the Magone inventory survey in 2014, for a total of 67 documented in the project planning area. The majority of projectile points were typed to the Elko series which dates between 3,500 and 1,250 Before Present (BP) (Justice 2002). This is broadly consistent with the Malheur National Forest as a whole. Rosegate series projectile points are also prevalent in the project planning area.

Typologies demonstrate that the Magone project planning area was inhabited through much of the Holocene Era. Use appears to have been most intensive during the late Middle Archaic (1,250 to 5,300 BP). Use seems to reach its peak and then decline during the Late Archaic period.

Five rock feature sites exist in the Magone project planning area; none have been given a cultural affiliation or date range due to a lack of diagnostic information. Four out of the five rock features are cairns. None of these sites appear to be associated with artifacts that securely place them within a certain age range, and it is difficult to accurately assign the sites with a historic or prehistoric status.

There is one recorded cambium peeled tree within the project planning area. In the past, the Burns Paiute Tribe has expressed particular interest in cambium ponderosa pine peeled trees. These culturally modified features are considered an important link to the Tribe’s ancestral and historic past. Whenever they are a safety hazard, the trees will need to be removed in consultation with the Tribe. The density of culturally important plants was low according to our records and survey notes.

In the project planning area, land use during the historic period was primarily associated with livestock grazing and the administration of public land use by Forest Service personnel. Eleven historic sites (including multicomponent sites) have been identified during previous surveys. Two of the eleven historic sites include buildings identified as cabins.

One historic site and one historic isolate located within the Magone project planning area is the Lake Butte Lookout tower. The Lake Butte Tower was built in 1924 (Mosgrove 1980). The other Forest Service site was discovered through archival research and has been identified as a triangulation station. Stations such as this one were implemented by the Forest Service to assist in map making. The original site report describes the site as being the location of a U.S. Geological Survey benchmark dated to 1938 and 1940 with the reference mark dated to 1941. Both of the Forest Service related sites were monitored during the 2014 field season.

The condition of archaeological sites within the project planning area varies. The integrity of historic sites, such as wooden structures and log troughs, are affected by weathering and wild fires. Many pre-contact sites within the project planning area have experienced disturbances from historic livestock grazing, logging, road building, modern recreation infrastructure construction and activity, and artifact collecting.

The Cultural Resource Inventory Report for the Magone project planning area is in the process of being completed and will be sent to the Oregon State Historic Preservation Office for review.

## 3.13.3 Environmental Consequences

This section of the report consists of a non-quantitative analysis of the direct, indirect, and cumulative effects of the silviculture treatments, prescribed burning, road activities, recreation opportunity improvements, and Magone Lake restoration activities on cultural properties and resources in the project planning area.

A project is considered to have an adverse effect on cultural properties when it results in the alteration of characteristics that qualify the property for the National Register of Historic Places (NRHP). The cultural properties that have been identified within the Magone project planning area are eligible or potentially eligible (unevaluated for the NRHP on the basis of their ability to yield scientific information that is important to studies of prehistory and history). Therefore, proposed activities that modify the patterning of surface or buried archaeological deposits are considered to result in an adverse effect.

### 3.13.3.1 Indicators for Assessing Effects

No applicable issues.

### 3.13.3.2 Methodology

Cultural resource identification efforts in the vicinity of the Magone project planning area have focused on two primary types of resources: pre-contact archaeological sites and historic archaeological sites. Places that may support resources of contemporary tribal interest (i.e., culturally significant plant locations) were also considered.

In accordance with the National Historic Preservation Act of 1966, National Environmental Policy Act of 1969, Executive Order 11593, and Forest Service Manual Chapters 2361 and 2363, a pre-field investigation and subsequent archaeological survey was performed for the proposed Magone Project in an attempt to locate all visible cultural resource sites that may be eligible for nomination to the National Register of Historic Places and could potentially be impacted by the undertaking.

The Malheur National Forest Inventory Plan stipulates that a survey design will be completed for inventories using the stratified probability zones defined in the plan. The Forest uses a GIS-based probability based on the criteria provided in the inventory plan.

### 3.13.3.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

By definition, direct and indirect effects (40 CFR 1508.8), and cumulative effects (40 CFR 1508.7) result from the action alternatives, and thus are not germane to the no action alternative.

Fuels loads across the landscape would not be reduced under alternative 1. As such, the threat of severe or moderately severe wildfire would not contribute to the long-term stability of heritage sites.

#### *Cumulative Effects*

By definition, cumulative effects (40 CFR 1508.7) result from the action alternatives, and thus are not germane to the no action alternative. Because there would be no direct or indirect effects, no cumulative effects would occur.

### 3.13.3.4 Alternatives 2, 3, and 4

#### *Direct and Indirect Effects*

A project is considered to have an adverse effect on historic properties when it results in the alteration of characteristics that qualify the property for the National Register of Historic Places. Most of the historic properties within the Magone project planning area have been determined eligible or potentially eligible for listing on the National Register of Historic Places under Criterion D—have yielded, or may be likely to yield, information important in prehistory or history. Therefore, proposed activities that modify the patterning of surface or buried archaeological deposits are considered to result in an adverse effect.

The majority of the proposed activities are expected to have no, or extremely minor, direct effects on all known heritage sites within the project planning area as long as the PDCs in Appendix C – Project Design Criteria are followed. In most cases, eligible or unevaluated sites would be avoided or properly mitigated throughout the lifetime of any of the proposed activities. Following the PDCs, there is no difference in the potential for effects between the three action alternatives. This is because all sites would be avoided or mitigations put in place regardless.

There is potential for project activities to cause effects to previously undocumented cultural resources. If during project activities, cultural material is encountered, all activities would cease immediately and a Forest Service Heritage specialist would be contacted to evaluate the discovery.

Unanticipated discoveries and/or known sites may be protected before implementation occurs by rerouting if it is determined there is potential to adversely affect the hypothetical historic property. Consultation with the SHPO, Indian tribes, and other interested parties is required to determine measures to avoid, minimize, or mitigate the adverse effect according to the Programmatic Agreement or 36 CFR Part 800 regulations.

Some habitat for plants that are of historic importance to regional groups of Native Americans may be enhanced by the vegetation treatments. As the fuel load is reduced via specific silviculture treatments, habitat of native plant populations like huckleberry would be improved.

An additional indirect effect may result by reducing the accumulations of fuels through commercial and non-commercial thinning and other proposed fuel reduction activities associated with this project. This would reduce the severity of potential wildfires and would enhance the long-term stability of archaeological and historic resources within areas adjacent to the Magone Project.

#### *Cumulative Effects*

Past and future management projects have the potential to impact cultural resources within the project planning area. These projects can cause surface disturbance that affect the integrity of the historic features and pre-contact sites. Implementation of the mitigation measures addressed should prevent, or at least reduce, impacts that are currently affecting archaeological sites within these allotments. However, the cumulative effects of natural elements, logging, road building, grazing, surface collection and/or illegal digging, and natural fuels reduction projects could still be reflected in these sites. Impacts to tribal uses would be cumulative with past and future management of vegetation. Future vegetation management projects should have a positive effect on vegetation and associated resources in the long-term which should have a beneficial impact to tribal uses.

#### 3.13.3.5 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

The legal framework that mandates the Forest to consider the effects of its actions on cultural resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Implementing regulations that clarify and expand upon the NHPA include 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places), and 36 CFR 296 (Protection of Archaeological Resources). The Pacific Northwest Region (Region 6) of the Forest Service Advisory Council on Historic Preservation (ACHP) and the Oregon State Historic Preservation Office (SHPO) signed a programmatic agreement (PA) regarding the management of cultural resources on National Forest system lands in 2004. The 2004 PA outlines specific procedures for the identification, evaluation, and protection of cultural resources during activities or projects sponsored by the Forest Service. It also establishes the process that the SHPO utilizes to review Forest Service undertakings for NHPA compliance.

The National Environmental Policy Act (NEPA) is also a cultural resource management directive, as it calls for agencies to analyze the effects of their action on socio-cultural elements of the environment. Laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act (ARPA) of 1979, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and Executive Order 13007 (Indian Sacred Sites) also guide Forest Service decision making as it relates to heritage resources. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the impacts of their projects on the free exercise of traditional Indian religions.

## 3.14 Analysis Issue – Roads

The primary access routes to the Magone project planning area are County Road 18 and Hwy 395. Other main access roads are Forest Service roads (FSR) 3600, 3618, 3620, 3940, and 3947, which are either maintenance level 2 or 3 roads with an aggregate or improved surface. These roads are considered part of the Malheur National Forest primary road system and are used on a regular basis.

Each road in the project planning area was field checked and road condition surveys were completed to reflect existing conditions. An interdisciplinary process was then used involving members of the Blue Mountain Ranger District staff to complete the roads analysis for the Magone Project. The team was charged with analyzing all of the roads in the project planning area and recommending whether each road should remain open, be closed, re-opened, or decommissioned. This determination was based on the guidelines included in the Malheur National Forest Roads Analysis Report, dated December 2004.

Project level roads analysis strives to meet long-range road density goals established in the Malheur Forest Plan by identifying opportunities to reduce both open road densities and total road densities. The result of these efforts should focus on reducing the amount of funding needed for road maintenance, reducing road related impacts to fish and wildlife, and reducing the spread of invasive plants while balancing needs for public and administrative access.

### 3.14.1 Existing Condition

This section describes the existing condition and its effects on access and travel management and maintenance of National Forest System roads in the Magone project planning area. Road maintenance, temporary road construction, road closures, and decommissioning are the proposed activities that would potentially affect access and travel management and maintenance. These activities can affect resources such as wildlife habitat, water quality, and fish habitat. The management and maintenance of open roads comes at a cost to the federal government. The fewer miles of open road on the Forest, the less cost to the taxpayer. The agency's top priority is to provide a road system that provides administrative access, is responsive to public needs, safe and environmentally sound, and affordable and efficient to manage.

In 1908, the Malheur National Forest was established and a slow but steady road-building program began. Most of these roads were established to facilitate fire protection and other administrative duties. A limited number of roads were constructed primarily to expedite recreational use of the Forest. By 1928 there were 383.5 miles of road on the Forest (Mosgrove 1980). This was sufficient, in theory, to allow firefighters to reach any fire reported on the Forest within one hour. The pace of road building increased in the 1930s through the 1980s as larger networks of roads were developed to support commercial timber harvest and, to a lesser extent, recreation on the Forest. By the late 1980s, over 8,000 miles of road existed on the Malheur National Forest (USDA Forest Service 1990a, Appendix I). Most roads on the Forest were originally constructed for commercial access purposes including grazing, timber, and mineral extraction. Other roads were developed to access administrative sites, private property, recreation facilities, trailheads, power line corridors, or construction for other administration purposes.

The Magone project planning area encompasses approximately 27,000 acres in the Grub Creek and East Fork Beech Creek subwatersheds, which equals 42.2 square miles. The existing total road density is 2.6 miles/square mile for maintenance level (ML) 1, 2, and 3 roads.

The transportation system associated with the Magone Project consists of 163 roads in the project planning area, totaling 110 miles under Forest Service jurisdiction (Table 120). Approximately 3 roads totaling 12 miles are ML 3 roads. Approximately 60 roads totaling 35 miles are ML 2 roads. Approximately 100 roads totaling 63 miles are ML 1 roads; these roads were closed under previous NEPA decisions.

**Table 120. Transportation system in the Magone project planning area**

| Maintenance level (ML) | Number of roads | Miles of road |
|---|---|---|
| ML 1 - Closed | 100 | 63 |
| ML 2 - Open | 60 | 35 |
| ML 3 - Open | 3 | 12 |
| Total | 163 | 110 |

Of the road maintenance levels currently in use, three levels apply within the Magone project planning area.

**Maintenance Level 1 (ML 1): Closed Road –** The ML 1 roads in the Magone project planning area in the following condition:

- A closed road may have a physical closure, such as an earth berm, pole gate, or be closed naturally by vegetation. These roads are effective closures.
- A closed road may also be closed with an earth berm or pole gate where the earth berm has been breached or a pole gate has been damaged. These are not effective closures and the roads are being used by the public.
- A closed road may have no physical closure or sign indicating the closure. These roads are also being used by the public.

**Maintenance Level 2 (ML 2): Open Road** – The ML 2 roads in the Magone project planning area are in either in fair or poor condition as described below:

- Fair condition of the roadbed would have an aggregate, improved, or native surface with good drainage features.
- Poor condition of the roadbed would mean there are not enough drainage features and major rutting of the roadway is present. Drainage features such as cross drains and water bars are not always present or not functioning correctly, causing erosion rutting and damaging the road surface.
- Poor condition could also be the road is physically closed on the ground by natural vegetation overgrowth or no sign of the designed roadway due to no public or administrative use.

**Maintenance Level 3 (ML 3): Open Road** – Surveys in the Magone project planning area have found ML 3 roads in the following condition:

- Open, good to fair condition

The maintenance needs of local roads (ML 1, 2, and 3) are often deferred because funds to maintain roads to standard are unavailable. The overall result is that most of the Forest road system is in a deteriorating condition; this is particularly true for many ML 2 roads that remain open despite receiving little maintenance. Most of the roads in the Magone project planning area would need to receive maintenance to meet current road maintenance objectives and classification standards.

Some roads in the Magone project planning area traverse private property, but have a right-of-way agreement in place allowing access. There is 1 road, totaling 0.10 miles, on private property with no right-of-way access. Use of this road will be analyzed through the planning process.

There are 100 ML 1 roads shown as being closed in the Forest Service INFRA (infrastructure) database (Table 120). Most of these roads were closed by past NEPA decisions as far back as 1990 and 1992. Approximately 70 of of the ML 1 roads (70 percent) are closed by either natural vegetation overgrowth or a physical closure. These closures are effective. Approximately 30 of the ML 1 roads (30 percent) are open on the ground and being used by the public because there is no physical closure, the existing closure (pole gate) has been damaged, or an earth berm has been breached. When road closure efforts are not effective at eliminating motorized use, it results in detrimental resource impacts and an increase in need for maintenance and associated funding. These roads will be effectively closed as specified in the past NEPA decisions, and closure could be implemented during this project or within the next 5 years depending on funding availability.

## 3.14.2 Environmental Consequences

### 3.14.2.1 Indicators for Assessing Effects

The measurement indicators detailed in Table 121, are used for assessing the effects to the transportation system in the Magone project planning area.

**Table 121. Roads resource indicators for assessing effects**

| Objective | Indicator |
|---|---|
| Assess change to road density | Road density |
| Assess change to miles of road open to the public | Miles of open road |
| Assess change to miles of road closed to the public | Miles of closed road |
| Assess change to miles of National Forest System roads | Miles of road to be decommissioned |

### 3.14.2.2 Methodology

Each road in the project planning area was field checked and road condition surveys completed to reflect existing conditions. Information sources for transportation analysis include the transportation GIS records that house the spatial data for road locations. An inventory of road attributes for National Forest System (NFS) roads is maintained for the National Forest through the I-Web database. A complete list of road attributes and definitions of these attributes is located in the project record.

The Magone interdisciplinary team reviewed each road in the project planning area to provide recommendations on whether to open, close, re-open, or decommission that road based on the road's condition, the access it provides, and if the road is detrimentally impacting forest resources. This determination was based on the guidelines included in the Malheur National Forest Roads Analysis Report (USDA Forest Service 2004). This analysis was designed to provide the decision-maker with the information needed to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal adverse ecological effects on the land, and are more in balance with available funding for needed management actions.

Project level road analyses need to continue to strive to meet long-range road density goals by identifying opportunities to reduce both open road densities and total road densities. The results of those efforts focus on reducing the amount of funding needed for road maintenance, reducing road related impacts to fish and wildlife, and reducing the spread of invasive plants.

### 3.14.2.3 Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present, and foreseeable activities relevant to the cumulative effects analysis for the transportation system include road closures authorized by past planning decisions and use and maintenance of Forest system roads, which includes road blading, brushing, cleaning ditches, cleaning culverts, etc.

### 3.14.2.4 Alternative 1 – No Action

*Direct and Indirect Effects*

Under the no action alternative, all existing open roads would remain open in their current condition. Access would be provided at existing levels; however, there would be no opportunity to close or decommission roads or to improve drainage by installing additional drainage dips, water bars, or cross ditches.

The no action alternative would leave road densities and miles of road unchanged. Road maintenance and motorized access would continue at current levels. This alternative has the least impact on access.

Alternative 1 (no action) would not bring this area closer to meeting the standards and guidelines in the Malheur Forest Plan for road densities, fish habitat, or water quality.

This alternative would continue to deliver sediment into streams at the current level or higher and would remain at the same cost to the federal government to meet road maintenance standards. Alternative 1 would not provide opportunities to do maintenance, which has drastically declined over the past decade.

Unneeded roads, such as those proposed for decommissioning under the action alternatives, would remain on the road system. As a result, the Forest backlog of deferred maintenance would continue to grow in magnitude.

*Cumulative Effects*

There would be no cumulative effects from past and present projects because the no action alternative would not change road densities or miles. Current levels of road maintenance and motorized access would continue at current levels. The cumulative effects related to road maintenance costs for the entire road system would remain the same.

### 3.14.2.5 Activities Common to Alternatives 2, 3, and 4

Several road-related activities are proposed in the project planning area, including road maintenance, construction of temporary roads, decommissioning roads, closing roads, converting roads to trails, and co-designating roads as trails (Table 122).

**Table 122. Summary of proposed road activities and road system changes within the Magone project planning area**

| Activities by alternative | Alternative 1 (no action) | Alternative 2 (proposed action) | Alternative 3 | Alternative 4 |
|---|---|---|---|---|
| Road maintenance for haul | 0 miles | 77.7 miles<br>78 road segments | 98.5 miles<br>105 road segments | 77.2 miles<br>77 road segment |
| Temporary roads | 0 miles | 9.3 miles<br>32 road segments | 13.3 miles<br>50 road segments | 8.9 miles<br>31 road segments |
| Closed roads to be temporarily opened for haul | 0 miles | 28.7 miles<br>45 road segments | 46.9 miles<br>68 road segments | 28.5 miles<br>45 road segments |
| Road decommissioning | 0 miles | 1.3 miles<br>5 road segments | 1.3 miles<br>5 road segments | 1.3 miles<br>5 road segments |
| Road closures | 0 miles | 1.1 miles<br>4 road segments | 0.5 miles<br>3 road segments | 0.5 miles<br>3 road segments |
| Co-designate existing roads as trails | 0 miles | 4 miles<br>8 road segments | 9.5 miles<br>15 road segments | 1.3 miles<br>3 road segments |
| Convert closed roads to trails | 0 miles | 1.2 miles<br>1 road segment | 0 miles | 0 miles |
| Close current ML 2 roads and co-designate as trails and ML 1 roads | 0 miles | 1.4 miles<br>2 road segments | 0 miles | 0 miles |

Note: ML = maintenance level.

### *Road Maintenance*

All of the work needed on proposed haul routes inside and outside of the project planning area is defined as maintenance under 36 CFR 212.1.

There are several haul roads that are maintenance level (ML) 1 roads and currently closed. These roads would be re-closed upon completion of other project activities (e.g., silvicultural treatments).

Road maintenance on the Malheur National Forest is based on traffic use. Of the five road maintenance levels currently in use, three levels of roads are within the Magone project planning area.

#### Maintenance Level 1 (ML 1)

Maintenance level 1 roads have been placed in storage between intermittent uses. The period of storage must exceed 1 year. Basic custodial maintenance is performed to prevent damage to adjacent resources and to keep the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are to “prohibit” and “eliminate” all traffic. The road is not open to traffic.

Roads receiving level 1 maintenance may be of any type, class, or construction standard and may be managed at any other maintenance level during the time they are open for traffic. While being maintained at level 1, the road is closed to vehicular traffic but may be available and suitable for non-motorized uses. Opening a closed road is normally considered maintenance.

**Maintenance Level 2 (ML 2)**

Maintenance level 2 is assigned to roads open for high clearance vehicles. Passenger car traffic, user comfort, and user convenience are not considerations. Traffic volume is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Route markers and regulation signs are in place and useable. The road is open to traffic.

**Maintenance Level 3 (ML 3)**

Maintenance level 3 is assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed with single lanes and turnouts. Appropriate traffic management strategies are to either “encourage” or “accept.” For certain classes of vehicles or users, “discourage” or “prohibit” strategies may be employed.

### *Road Maintenance Activities*

Forest roads used for thinning and product extraction would have road maintenance activities to varying degrees, dependent upon severity of road damage, erosion and sediment production, and designated maintenance level. Because the maintenance work would be commensurate with use, the amount actually accomplished would vary depending on existing road conditions, season of use, and other factors. The following work is included in the maintenance requirements for roads:

- Blading and shaping road including existing drain dips and grade sags
- Constructing water bars/cross ditches
- Roadside brushing
- Removing danger trees
- Seeding
- Spot rocking in wet area of the roadway
- Removing snow
- Minor realigning of road junctions
- Cleaning culverts
- Removing excess material from roadway
- Placing fill material for major rutting in the roadway
- Installing minor drainage features
- Watering roadway for dust abatement

In addition, construction requirements would be used for roads requiring the following work:

- Major realignment
- Constructing drain dips
- Constructing and installing wood pole or steel gate closure devices

Under the action alternatives, danger trees would be felled along haul roads. This would result in increased user safety during project activities as well as increased public safety on roads that are open to public access after activities are complete.

### *Temporary Roads*

A temporary road is a short-term system road constructed and rehabilitated under the terms of the contract. If the road will be needed for future resource management subsequent to the contract termination day, it must be constructed as a specified road. Temporary roads are roads authorized by contract, permit, lease, or other written authorization or emergency operation not intended to be part of the forest transportation system and not necessary for long-term resource management. Temporary roads are not intended to be included as part of the forest transportation system, as they are managed by the projects or activities under which they are authorized and decommissioned at the conclusion of the authorized activity. Rehabilitating a temporary road is considered a permanent closure. Soil compaction would be reduced where feasible and cut or fill slopes may be returned to natural contours.

Road rehabilitation would include a combination of the following design criteria:

- Water-barring as needed to restore natural drainage patterns.
- Re-contouring slopes (removing cut and fill slopes) and pulling berms from the edge of the road back onto the road.
- Sub-soiling (loosening) compact soils in a “J” pattern to a depth of approximately 16 inches (unless prevented by bedrock or rock content of soils).
- Planting or seeding disturbed areas with native species that naturally occur in the project planning area to achieve a minimum of 35 percent ground cover.
- Placing slash, boulders, and logs on the roadbed (where available).
- Disguising the visible road entrance with pieces of cull logs, tops of cut trees, and/or rocks to prevent vehicle use.

### *Decommissioning Roads*

Decommissioned roads are roads permanently closed by official actions and no longer on the transportation map. These roads would be permanently removed from the Forest transportation system, either because there is no reasonably foreseeable need for the road or because continued use of the road is not compatible with aquatic habitat protection needs. The goal is to establish a condition that will not require custodial maintenance in the future, through stabilization and restoration to a more natural state.

Road decommissioning treatments are designed to improve hydrological and ecological function. Roads to be decommissioned would be rehabilitated by applying the design criteria for closure of temporary roads (listed above) with the following exceptions/additions:

- All culverts, roadside ditches, and ruts would be removed.
- Stream crossing areas would be reshaped to resemble a natural condition by meeting the Road and Trail Erosion Control and Decommissioning Requirements found in the Programmatic Biological Opinion for Aquatic Restoration (USDI FWS 2013a).
- Erosion control measures (sediment filters or straw bales) would be utilized where necessary to prevent sediment from reaching the stream. Dispose of fill or waste material in stable sites out of the flood-prone area.
- The road surface would be reshaped or out-sloped, and/or frequent cross ditches or water-bars would be constructed to ensure there is not a continuous flow pattern to the stream.

- Effective barriers at the beginning of the road (e.g., berms, rocks, logs, etc.) would be installed to prevent vehicle use.

*Closing Roads*

Closures are proposed when there is no short-term management need for the road and/or closing the road is needed to address other resource concerns or needs.

### 3.14.2.6 Alternative 2 – Proposed Action

*Direct and Indirect Effects*

Implementation of the proposed action would result in a temporary increase in open road densities in and adjacent to the project planning area during the periods when roads are being used for timber haul and project activities (e.g., silvicultural treatments). Approximately 9.3 miles of temporary roads would be constructed under this alternative. Temporary roads would be restored to ensure soil productivity is restored, the road has adequate drainage and ground cover to prevent erosion, the road is no longer drivable, and the road is not highly visible approximately 5 years after completion of project activities. Approximately 28.7 miles of closed roads would be re-opened under this alternative. Closed roads that are opened for project activities would be re-closed long-term with the same type of closure devices that were present before, using earthen berms or gates and roadway slash. After project activities are complete, the open road density would be approximately 1.1 miles per square mile inside the project planning area boundaries for motorized use by the public under this alternative. The total road density upon the completion of project activities would be approximately 2.5 miles per square mile under this alternative which includes both open and closed roads.

The condition of haul routes would be improved by maintenance activities associated with timber harvest. Direct beneficial effects from the proposed action would include improved road drainage and surface conditions. Maintenance activities would have limited adverse effects on the use of roads, as roads would remain open during project activities. To bring the roads up to a standard needed for commercial haul, road maintenance activities are proposed on approximately 77.7 miles of road in alternative 2. There are approximately 1.1 miles of road to be permanently closed, 1.3 miles of road to be closed and co-designated as trail and maintenance level 1 road, and 1.3 miles of roads to be decommissioned under this alternative. These actions would decrease road density in the project planning area, which would potentially help secure wildlife habitat and reduce the amount of sediment released into the streams. There are 0.8 miles of road currently naturally closed on the ground that would be closed under this alternative. The closing of these roads would have no effect on the current travel access in the project planning area. Table 123 below captures the road system changes under alternative 2 for the Magone project planning area.

**Table 123. Alternative 2 road system changes**

| Road # | Prescription | Current maintenance level | Beginning mile post | Ending mile post | Miles |
|---|---|---|---|---|---|
| 1800-760 | Close road and co-designate as a trail and maintenance level 1 road | 2 | 0.00 | 0.90 | 0.90 |
| 1800-933 | Decommission (excluding area used as dispersed campsite) | 2 | 0.00 | 0.30 | 0.30 |
| 3600-162 | Close road | 2 | 0.00 | 0.40 | 0.40 |
| 3600-187 | Close road | 2 | 0.10 | 0.10 | 0.10 |
| 3600-612 | Close road | 2 | 0.00 | 0.40 | 0.40 |
| 3618-083 | Convert road to trail | 1 | | | 1.2 |
| 3618-125 | Close road and co-designate as a trail and maintenance level 1 road | 2 | 0.00 | 0.40 | 0.40 |
| 3940-071 | Close road | 2 | 0.39 | 0.60 | 0.21 |

### *Cumulative Effects*

The cumulative effects of the proposed road maintenance, road closures, and decommissioning combined with foreseeable annual road maintenance activities and road closures would be fewer roads to maintain, less money needed for maintenance, and improved road conditions on open roads for all forest users.

Approximately 63 miles of roads in the project planning area are currently designated in the transportation system as closed to vehicular travel based on prior planning decisions. However, because many of these roads are ineffectively closed, their existence and use potentially impacts wildlife habitat and security, soil and timber productivity, and water quality. These roads will be effectively closed as specified in past decisions, and closures could occur during implementation of this project. There would be approximately 65.4 miles of closed roads in the project planning area following implementation under this alternative.

The Magone Project proposed trail conversions, road closure and decommissioning actions, combined with foreseeable road closures in the future, would result in approximately 43.3 miles of open roads in the project planning area under this alternative.

## 3.14.2.7 Alternative 3

### *Direct and Indirect Effects*

The direct and indirect effects are generally the same as described for alternative 2; with the exception that alternative 3 has minor variations of road system activities and changes that are captured in Table 122. There would be 0.8 fewer miles of road closures, currently open roads would not be closed and co-designated as trail and maintenance level 1 road (a reduction of 2.6 miles), closed roads would not be converted to trail (a reduction of 1.2 miles). Approximately 13.3 miles of temporary roads would be constructed under this alternative. After project activities are complete, the open road density would be approximately 1.1 miles per square mile inside the project planning area boundaries for motorized use by the public under this alternative. The total road density upon the completion of project activities would be approximately 2.5 miles per square mile under this alternative which include both open and closed roads.

To bring the roads up to a standard needed for commercial haul, road maintenance activities are proposed on approximately 98.5 miles of road in alternative 3. The proposed increase in miles of road to receive maintenance under this alternative would not only improve the condition of roads during implementation of project activities, but would also reduce the cost and need for maintenance after completion of project activities. There are minor variations in the amount of road system changes and activities under this alternative; however, the direct and indirect effects would remain consistent with that of alternative 2. Table 124below captures the road system changes under alternative 3 for the Magone project planning area.

**Table 124. Alternative 3 road system changes**

| Road # | Prescription | Current maintenance level | Beginning mile post | Ending mile post | Miles |
|---|---|---|---|---|---|
| 1800-933 | Decommission (excluding area used as dispersed campsite) | 2 | 0.00 | 0.30 | 0.30 |
| 3600-187 | Close road | 2 | 0.10 | 0.10 | 0.10 |
| 3940-071 | Close road | 2 | 0.39 | 0.60 | 0.21 |

*Cumulative Effects*

The cumulative effects of the proposed road maintenance, road closures, and decommissioning combined with foreseeable annual road maintenance activities and road closures are generally the same as described for alternative 2; with the exception that alternative 3 has minor variations of road system activities and changes that are captured in Table 122.

### 3.14.2.8 Alternative 4

*Direct and Indirect Effects*

The direct and indirect effects are generally the same as described for alternative 2; with the exception that alternative 4 has minor variations of road system activities and changes that are captured in Table 122. There would be 0.8 fewer miles of road closures, currently open roads would not be closed and co-designated as trail and maintenance level 1 road (a reduction of 2.6 miles), closed roads would not be converted to trail (a reduction of 1.2 miles). Approximately 8.9 miles of temporary roads would be constructed under this alternative. After project activities are complete, the open road density would be approximately 1.1 miles per square mile inside the project planning area boundaries for motorized use by the public under this alternative. The total road density upon the completion of project activities would be approximately 2.5 miles per square mile under this alternative which include both open and closed roads.

To bring the roads up to a standard needed for commercial haul, road maintenance activities are proposed on approximately 77.2 miles of road in alternative 4. Although the miles of road to receive maintenance under this alternative is less than the proposed miles of road maintenance in alternatives 2 and 3, the cost and need for maintenance would also be reduced after completion of project activities under alternative 4. There are minor variations in the amounts of road system changes under this alternative; however, the direct and indirect effects would remain consistent with that of alternative 2 and 3, respectively. Table 125 below captures the road system changes under alternative 4 for the Magone project planning area.

**Table 125. Alternative 4 road system changes**

| Road # | Prescription | Current maintenance level | Beginning mile post | Ending mile post | Miles |
|---|---|---|---|---|---|
| 1800-933 | Decommission (excluding area used as dispersed campsite) | 2 | 0.00 | 0.30 | 0.30 |
| 3600-187 | Close road | 2 | 0.10 | 0.10 | 0.10 |
| 3940-071 | Close road | 2 | 0.39 | 0.60 | 0.21 |

*Cumulative Effects*

The cumulative effects of the proposed road maintenance, road closures, and decommissioning combined with foreseeable annual road maintenance activities and road closures are generally the same as described for alternative 2 and 3; with the exception that alternative 4 has minor variations of road system activities and changes that are captured in Table 122.

### 3.14.2.9 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Alternatives 2, 3, and 4 meet Malheur Forest Plan standards for road density and moves the project planning area toward meeting the overall desired condition for road density in big game summer and winter range.

Specific Malheur Forest Plan standards and desired future conditions are:

- To maintain roads and trails to the minimum level required to meet integrated land management objectives; and minimize tie-through roads (USDA Forest Service 1990a, Forest-wide standard 157, page IV–42).
- To limit the disturbance to big game, the open road density in big game summer range will be 3.2 miles per square mile by 1999 (USDA Forest Service 1990a, Forest-wide standard 33, page IV–29).
- To limit disturbance to big game, the road density in big game winter range will be 2.2 miles per square mile by 1999 (USDA Forest Service 1990a, Standard 24, MA-4A, page IV–22).
- Overall desired condition in the Malheur Forest Plan is 1.5 miles per square mile in summer range and 1.0 miles per square mile in winter range (USDA Forest Service 1990a, Desired Future Condition, fish and wildlife, page IV–6).

## 3.15 Analysis Issue – Visuals

This section describes scenery values and effects associated with the Magone Project. Viewing scenery is one of the most popular recreation activities on the Malheur National Forest (National Visitor Use Monitoring; USDA Forest Service 2009b). Scenery is a primary public value and legacy within the national forests, benefitting 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 the unit may have for visitors.” In other words, managing visual resources is managing the scenic views visitors expect within specific areas. The Malheur Forest Plan specifies the desired level of management based on physical and sociological characteristics of a management area.

This is the visual quality objective (VQO) and it refers to the degree of acceptable alteration of the characteristics of the landscape. Additionally, this section will also evaluate the scenic stability of the visual resource. Scenic stability measures sustainability of the valued scenic character and its attribute 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 variation as a reference baseline for sustainability” (Mattson 2012).

The Magone and County Road 18 visual corridors are located along portions of Forest Service roads 36, 3618, and 3620 and County Road 18, which provide primary access into the Magone Lake area. These corridors include all of the foreground and middleground area visible (and potentially visible) from the roads described above. Visitor sensitivity is significant along these routes because they provide access to the popular Magone Lake Campground and day use area. The proposed Magone Project lies in a sensitivity level II corridor with a visual quality objective of partial retention in the foreground and modification in the middleground. Partial retention objectives are met when the results of management activities are noticeable to the casual forest visitor; however, visual changes are not so obvious as to dominate a particular portion of the landscape. There is a completed visual corridor plan for Magone; this plan excludes the Magone Lake geological area.

This evaluation applies current National Forest Scenery Management methodology in conjunction with existing Malheur Forest Plan direction (USDA Forest Service 1990a). This includes scenery sustainability concepts described in Landscape Aesthetics, A Handbook for Scenery Management, Agriculture Handbook 701 (USDA Forest Service 1995c) and Recommended SMS Refinements (USDA Forest Service. 2007. Appendix J). This analysis relies on field studies and photography from Magone and County Road 18 visual corridor sensitive viewpoints and other views of the project planning area, as well as coordination with project interdisciplinary team members and consideration of public preferences for scenic quality. Cumulative scenic quality was evaluated within the geographic scope of roadways and other sensitive public viewpoints within and adjacent to the project planning area. Integration of this scenery analysis will assure the Magone Project is consistent with scenery-related Malheur National Forest direction, Forest Service policies, and applicable elements of Forest Service Visual Management and Scenery Management Systems.

### 3.15.1 Existing Condition

The overall project planning area provides a mostly natural appearance. The exception is the recent County Road 18 Project that has evidence of harvest activities less than 2 years old. Roads, landings, logging residues, and openings created by harvesting are noticeable to the casual visitor traveling along County Road 18.

The existing project planning area is characterized by scattered pine and fir overstory above a dense layer of grand fir and Douglas-fir trees. Snags and dying trees are highly visible in portions of the area.

#### 3.15.1.1 Ecosystem Context

Vegetation, as the major scenery attribute of the Magone project planning area, offers opportunities for both scenery and ecosystem improvement. The Magone project planning area's dense conifer vegetation often obscures views of existing scenery attributes within and below the understory, and restricts or prevents the presence of many potential scenery attributes. Among the many potential scenery attributes that are under-represented are large trees 26 to 36 inches or more diameter at breast height (DBH) (USDA Forest Service 1990a, page IV-110), diverse and mature forest structures (especially Douglas-fir and ponderosa pine, both as individual trees and within stands), and small intra-stand openings or meadows with shrubs, grasses, and forbs. The existing dense and homogenous conifer vegetation also obscures forest floor accents, as well as outward "openings" to adjacent forests and landforms. In addition, logging, fire exclusion, and road construction on national forest and adjacent private lands have interrupted and diminished scenic vegetation attributes throughout the project planning area. These actions have made the forest canopy uniform in some places; in other places, the canopy is fragmented in patterns and shapes inconsistent with historical, ecologically established scenery.

#### 3.15.1.2 Scenic Character

The Magone project planning area's dominant scenic identity is its largely continuous conifer forest overlaying Clarno formation and Columbia River Basalt landforms, accented by meadows and a few rock features. The project planning area offers both close-up and distant views from the Magone and County Road 18 visual corridors in and around the project planning area. The major scenery attributes of the Magone project planning area are its diverse conifer-dominant forest vegetation with occasional large tree character, its riparian meadows, aspen, and its single large geological area. The forest canopy includes mixed conifer species stands as well as stands dominated by Douglas-fir or grand fir. Lower elevation portions of these stands are often interspersed by attractive wet and dry meadows, aspen trees/groves, and shrubs and forbs (e.g., Coxie Meadow). Patterns of this vegetative mosaic are typically fine-scaled, with forest canopy openings typically being less than an acre, while the meadows and geologic areas are typically much larger (25 to 185 acres). Minor scenery attributes include small scattered rocks and outcrops, fall colors, wildlife sightings of birds and mammals, and consistent atmospheric clarity. Research shows that such diversity of scenery attributes supports a positive viewing experience for people traveling through or recreating within the project planning area, and supports the quality of life for local residents and visitors (Ryan 2005).

#### 3.15.1.3 Existing Visual Quality

The existing visual quality is evaluated by looking at the scenery from the routes and sites that were utilized in assigning the visual quality objectives for the Malheur Forest Plan. An evaluation of the existing condition considers the degree of visual disturbances of past activities to the natural appearing scenery that is derived by the contextual landscape and the historical range of variability.

*Scenic Routes and Areas*

**Magone Foreground Visual Corridor**

There are 4,878 acres within the Magone foreground visual corridor. The Magone project planning area's dominant scenic identity is its largely continuous conifer forest overlaying Clarno formation and Columbia River Basalt. The typical view includes a mix of ponderosa pine, fir, western larch, mountain mahogany, and aspen plant communities. Mature, large diameter ponderosa pine with red to yellow colored boles are present but scattered.

Immature pine stocking varies from low to high density depending on site conditions. The view by East Fork Beech Creek has associated riparian vegetation in the foreground, with a backdrop of dense mixed-conifer stands on the north-facing slope above the stream. Past management activities in the timbered stands are not obvious to the casual observer. Riparian management activities, including man-made weirs and fencing, are noticeable. Stands above the stream are composed of a mix of Douglas-fir and ponderosa pine. Remnant mature and over-mature pine and Douglas-fir form a scattered overstory throughout most of the stands, occurring in clumps and individually. The understory fir is fairly healthy with relatively full crowns. Mistletoe is present in areas. Patches of dead and dying fir ¼ acres or less in size are visible at several points along the road. Terrain in these stands is generally steep. The visual impression created by most of these stands is of lush, dark green vegetation, providing high contrast to the open, airy appearance on the north side.

The dominant visual features along the private land are meadow and riparian vegetation and open pine stands north of the Forest Service road (FSR) 36. Large diameter pine are scattered throughout, but the majority of trees are immature. On FSR 36, the area opens up and is dominated by juniper-sage communities and thin stringers of ponderosa pine in shallow draws. On East Fork Beech Creek there is a visually diverse mix of brush, cottonwoods, aspens, and large ponderosa pine.

The junction of FSR 3618 and 3620 transitions from a healthy mix of pine and fir stands to an area of unhealthy mixed conifer showing signs of insect attack and disease. The area along FSR 3618 to Magone Lake Campground is dominated by ponderosa pine, fir, and juniper. From FSR 3618 (off of County Road 18) to Magone Lake Campground there are recent harvest activities from the County Road 18 project and past harvesting can be seen as one moves through this area. Most of the stands are screened by the densely stocked, multi-layered, mixed-conifer stands along the roadside; stand health conditions are poor due to overstocking, prolonged drought, and insect outbreaks. FSR 3620 provides views of large ponderosa pine and mixed conifer stands across Tinker Creek and short views of mixed conifer and scattered large pine up the slope to the east. Much of the route along FSR 3620 is overstocked lodgepole pine and ceanothus. Riparian vegetation is in poor condition (USDA Forest Service 1992).

The Magone Lake Geological Area (Management Area 8) is unique for the landslide formation that created Magone Lake. The slide face is not visible from the road; hundreds of large ponderosa pine growing at strange angles and numerous slump block terraces are visible from the road. Stands within the geological area are composed of a mature pine overstory above a mix of Douglas-fir, ponderosa pine, and grand fir. The suppression of wildfires in these stands has allowed an increasing amount of fir to develop beneath the pine and the majority of stands are moving toward a fir climax condition.

### Magone Middleground Visual Corridor

There are 136 acres of middleground within the Magone visual corridor. Middleground stands include the area beyond foreground stands in which individual trees are still visible but do not stand out distinctly from the stand. To determine the visual impact of proposed activities in middleground areas, viewing angles are important; one area may be visible from many locations. Presently, most of the middleground areas appear relatively undisturbed to the casual viewer. Stocking composition varies from pure pine stands on south slopes to mixed conifer stands on north-facing slopes. From a distance, many of the stands appear densely stocked.

**County Road 18 Foreground Visual Corridor**

There are 2,024 acres of foreground within the County Road 18 visual corridor and no middleground acres.

The most recent project within the foreground of County Road 18 was the creation of a fuelbreak—a strategic reduction of fuels within a wide block or strip of land to reduce flammability along County Road 18. The fuelbreak reduced the surface and ladder fuels and opened up the canopy.

Foreground areas would be managed for partial retention visual quality objective (Table 126). Management activities in foreground areas may be evident to the viewer, but must remain visually subordinate to the surrounding landscape.

### 3.15.1.4 Scenic Integrity and Stability

*Scenic Integrity*

Scenic integrity is a measure of the degree to which the scenery is free from visible disturbances that detract from the existing scenic character that people value. Integrity is used to manage the attributes of landscape character vegetative pattern, form, line, color, texture, and scale.

Scenic integrity is measured on the Malheur National Forest through six graduated levels defined by the visual quality objectives (VQOs) 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/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 126).

**Table 126. Scenic integrity as described by visual quality objective levels**

| Levels of scenic integrity/disturbance (visual quality objectives) | The Forest's scenic integrity as people perceive it |
|---|---|
| Preservation | Unaltered, visually complete or intact |
| Retention | Unnoticeably altered |
| Partial retention (the most common current condition in the Magone project planning area and also the Malheur Forest Plan's typical minimum scenery disturbance threshold for Magone project planning area) | Slightly altered |
| Modification | Moderately altered |
| Maximum modification | Heavily altered |
| Unacceptable modification (never an objective on National Forest System lands) | Unacceptably altered |

Scenic integrity is measured from sensitive viewpoints inventoried by the Malheur Forest Plan, and as supplemented by project level analysis. Sensitive viewpoints occur along the Magone and County Road 18 visual corridors. The project's thresholds for scenery disturbance (Malheur Forest Plan VQOs) apply only to views from these locations (see Appendix B – Maps, Map 37). The Magone Project's existing scenic integrity as viewed from these sensitive viewpoints typically meets the partial retention and modification levels.

There are occasional disturbances such as localized stumps, clearings, and roadways; however, the overall landscape appearance from the sensitive viewpoints is "slightly altered." Existing scenic integrity viewed from Magone and County Road 18 is largely undisturbed foreground scenery that cumulatively meets the partial retention level, with some minor or unnoticed contrasts such as existing roads, old skid roads, and scattered stumps that may individually meet partial retention or modification. The less frequent and more distant ½ to 4 mile middleground views available are largely natural appearing, overall meeting the modification level (Table 127).

**Table 127. Viewing zones that apply to visual/scenery management**

| Distance zone | Description |
|---|---|
| Foreground | The portions of a view between the observer and up to ¼ to ½ mile distant. |
| Middleground | The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand (approximately ½ mile to 4 miles) |
| Background | The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand (approximately 4 miles to horizon). |

Table 128 identifies the visual quality objectives for the management areas present in the Magone project planning area.

**Table 128. Visual quality objectives for specific management areas present in the Magone project planning area**

| Management Area | Acres* | Visual quality objective |
|---|---|---|
| General Forest (MA-1) | 8,700 acres | Retention to Modification |
| Rangeland (MA-2) | Included in MA-1 | Retention to Modification |
| Riparian Areas (MA-3)/ riparian habitat conservation areas (RHCAs) | 4,200 acres | Retention to Modification |
| Big-Game Winter Range Maintenance (MA-4A) | 4,000 acres | Retention to Modification |
| Special Interest Area – Magone Geological Area (MA-8) | 200 acres | Retention or Partial Retention |
| Developed Recreation Area (MA-12) | 300 acres | Retention or Partial Retention |
| Old Growth Habitat (MA-13) | 800 acres | Manage for VQO consistent with adjacent lands |
| Visual Corridors (MA-14F – Foreground)<br>Visual Corridors (MA-14M – Middleground) | 4,500 acres<br>100 acres | Magone and County Road 18 Foreground – Partial Retention<br>Magone Middleground – Modification |
| Wildlife Emphasis Area (with Non-Scheduled Timber Harvest) (MA-21) | 4,800 acres | Retention to Modification |

### *Scenic Stability*

Scenic stability is the degree to which the desired scenic character can be sustained through time and ecological progression (USDA Forest Service 1995c). For the project planning area, the existing scenic stability analysis focuses on the scenery attribute of vegetation, addressing its ecosystem conditions.

Scenic stability of other minor scenery attributes, such as landform, rock features, wildlife sightings, and atmospheric clarity are not involved in this evaluation, since they are not as critical to the Magone area's scenic character and will change relatively little over time, regardless of ecosystem and human influences.

The Magone Project scenic stability evaluation addresses current ecosystem conditions and stresses identified by field observation, data on vegetation and fire history, and interdisciplinary input from the Magone Project silviculture and fuels specialists. Assessing scenic stability for vegetation in the Magone project planning area is guided by methods described in Appendix J—Recommended SMS 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.

Some of the Magone Project's vegetation scenery attributes are considered ecologically unstable because they have departed from the stability of historical reference conditions, especially within the Nipple Butte Inventoried Roadless Area (IRA). The landscape within the IRA had a historical fire regime of frequent low-intensity fires, which limited the presence of fire-intolerant grand fir trees, favored greater numbers of shade-intolerant trees and meadows with aspen, and regularly removed understory woody debris. Many decades of fire exclusion have allowed grand fir stands to intrude on aspen, meadow, and pine vegetation, and transform these diverse vegetation scenery attributes into a much more uniform pattern. As described elsewhere in this section, much of the Magone project planning area is inconsistent with, and trending away from, vegetation conditions that are more sustainable in this fire-adapted ecosystem. Much of the project planning area is departed from historical vegetation conditions and departed from historical wildfire cycle conditions (see the Silviculture and Fire, Fuels, and Air Quality sections).

The six scenic stability levels described below can be directly correlated to this vegetation information for the Magone project planning area. The following are the scenic stability levels:

- **Very High Stability** – All dominant and minor scenery attributes of the valued landscape character are present and are likely to be sustained.
- **High Stability** – All dominant scenery attributes of the 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 the sustainability of the dominant scenery attributes.
- **Moderate Stability** – Most dominant scenery attributes of the 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 the valued scenic character are present and are likely to be sustained. Known scenery attribute conditions and ecosystem stressors may seriously threaten or have already eliminated the others.
- **Very Low Stability** – Most dominant scenery attributes of the 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 the valued scenic character are absent or seriously threatened by their conditions and ecosystem stressors. None are likely to be sustained, except relatively permanent attributes such as landforms.

The predominant ecosystem stress influencing the vegetation scenery attributes is the uncharacteristic grand fir encroachment throughout the project planning area, resulting from almost a century of wildfire exclusion. This stress has impaired or eliminated many important scenery attributes (diverse, spacious and fire-adapted forest canopies, large trees, meadows, and aspen) within widespread portions of the Magone project planning area. Continued stress from grand fir encroachment would further impair and eliminate these socially valued scenery attributes. Other stressors such as pests, disease, drought, wildfire, and climate change are currently less significant, but also have potential to further impair valued scenery. Collectively, current ecosystem stress upon scenery attributes is considered to be at the high end of moderate for the project planning area, within a potential range of minor, moderate, or severe.

Because the Magone project planning area's two major scenic attributes (diverse forest canopy with large canopy with large trees and meadows and aspen) share a typically moderate risk based on their condition and ecosystem stress, the scenic stability of these major vegetation scenery attributes correlates best with the low scenic stability level definition below:

- **Low stability** – Some dominant scenery attributes of the valued scenic character are present and are likely to be sustained. Known scenery attribute conditions and ecosystem stressors may seriously threaten or have already eliminated the others.

In conclusion, the existing scenic stability of the Magone Project's major vegetation scenery attributes is low.

Numerous trends in the Magone project planning area indicate scenic stability is in decline or could be rated low. The coniferous forest is generally overstocked in both ponderosa pine and mixed fir types, with excess ground and ladder fuels. Natural processes associated with fire exclusion are obvious. These conditions will make it difficult to keep wildfire starts from expanding rapidly and burning intensely. Fire suppression has resulted in a change in species and structural stage composition. These conditions pose a high risk of losing key components of the ecosystem and dominant scenic attributes such as the open, park-like stands of ponderosa pine and minor scenic attributes such as the aspen stands.

## 3.15.2 Environmental Consequences

### 3.15.2.1 Indicators for Assessing Effects

The two indicators used to measure the effects to scenery resources are scenic integrity and scenic stability. These two indicators evaluate the intensity and duration of effects as well as the degree to which the alternatives would affect the resiliency of scenery attributes over the long-term.

***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 due to human activities or extreme natural events inconsistent with the historic range of variability (USDA Forest Service 2007). The Malheur Forest Plan has standards and guides which utilize the visual management terms (i.e., visual quality objectives). This analysis will disclose the effects in these terms to verify whether or not the project alternatives will meet the standards and guides, as well as translate to the scenic integrity terminology. The following table displays a cross walk of the two differing sets of terminology.

**Table 129. Visual quality objectives and perceived alteration**

| Visual quality objectives | Scenic integrity as people perceive it | Scenic integrity objectives |
|---|---|---|
| Preservation | Unaltered, visually complete or intact | Very high |
| Retention | Unnoticeably altered | High |
| Partial retention | Slightly altered | Moderate |
| Modification | Moderately altered | Low |
| Maximum modification | Heavily altered | Very low |
| Unacceptable modification | Unacceptably altered | Unacceptable |

***Scenic Stability*** is the degree to which the desired scenic character can be sustained through time and ecological progression (USDA Forest Service 2007).

### 3.15.2.2 Methodology

Indicators of effects of the Magone Project on scenery include: (1) a description of changes to scenic integrity and (2) a determination of scenic stability (changes in the sustainability of scenery attributes). To determine these effects, Forest Service Scenery Management System (USDA Forest Service 2007) methods are applied to indicate changes in scenic character and its sustainability (scenic stability). Changes in scenery disturbance (scenic disturbance) are measured using criteria established by the Forest Service Landscape Aesthetics, A Handbook for Scenery Management, Agriculture Handbook 701 (USDA Forest Service 1995c) and Forest Service Visual Management System (USDA Forest Service 1974) as visual quality objectives (VQOs).

#### *Spatial and Temporal Context for Effects Analysis*

The Magone project planning area (and ½ mile surrounding it) is the spatial analysis area for scenic character and scenic stability because these apply to the entire area. Views from the sensitive recreation and public use roads or areas in or near the project planning area boundary are the spatial analysis area for scenic integrity. Descriptions of short-term scenery effects apply to those lasting less than 10 years; long-term scenery effects span 10 to 100 or more years.

### 3.15.2.3 Alternative 1 – No Action

#### *Direct and Indirect Effects*

**Scenic Integrity**

Alternative 1 would not produce any short-term visual disturbances or directly change the project planning area’s existing disturbances viewed from the project planning area’s scenic visual corridors. Many of the existing scattered minor and moderate disturbances described in the existing condition section would be greatly diminished through vegetative renewal over the next 10 years. However, potentially strong and adverse indirect scenic disturbance effects could become increasingly more likely with alternative 1, since declines in fire-adapted vegetation and ecological resiliency would continue in future decades throughout the project planning area. In the event of an uncharacteristic wildfire many of the desirable elements of landscape character would be lost for an extended period of time.

The Magone Project's scenic integrity as viewed from sensitive viewpoints would continue to meet the partial retention and modification level. The Magone and County Road 18 foreground would continue to meet the partial retention level, and the middleground views would meet the modification level.

**Scenic Stability**

The no action alternative would cause no direct effects to the existing condition. The indirect effects 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 the resiliency of the timber stands causing the scenic stability to be continually reduced as conditions degrade.

Scenic stability effects are based on assumptions for a continuation of the existing adverse vegetation conditions (of overly dense, small sized, and uniform vegetation), resulting in continued low stability. This level of scenic stability would likely persist for decades, unless vegetation and climate conditions result in an exceptionally large and severe canopy-consuming disturbance event (e.g., pests, insects, diseases, or wildfire), which could potentially lower the project planning area's vegetation scenic attributes to the no stability level.

*Cumulative Effects*

Alternative 1 would continue two trends: 1) scenic disturbance reductions through vegetation regrowth, and 2) scenic impairment through increased tree density and loss of attractive variety (conifer stand spatial/structural diversity with large tree character and fire-adapted vegetation such as western larch, ponderosa pine, and Douglas-fir) and impaired ecosystem resilience.

### 3.15.2.4 Alternatives 2, 3, and 4

*Direct and Indirect Effects*

**Scenic Integrity**

***Silviculture treatments and prescribed burning***: Silviculture treatments and prescribed burning would produce minor short-term scenery disturbances, including visible soil color, canopy and tree/plant contrasts such as stumps, skid roads, burn piles, burn areas, and landings. A small portion of these effects would be visible from the project planning area's visual corridors.

Commercial harvest leaves stumps which are visible from an immediate foreground distance (300 feet). Commercial harvest would open up the stands and allow more sunlight into the forest floor, and provides a longer viewing distance into the forest stands.

The activities of commercial harvest that would occur include tractor logging and skidding, skyline logging and helicopter logging. Tractor logging and skidding creates some soil disturbance along the skid trails tearing up the topsoil and exposing the soils. So, the understory vegetation is torn up along these skid trails which are visible from an immediate foreground distance. These visual effects are usually an immediate impact that dissipates within a short period of time. As vegetation returns the impacts are usually not visible after a growing season to the casual viewer. Skyline logging creates similar effects as tractor logging. The skid trails associated with skyline logging are usually longer than those associated with tractor logging. These trails can often times be visible from middleground viewing distances. However, the effects are also short-term.

Non-commercial thinning removes trees up to 11 inches diameter at breast height where these trees are in excess. This activity is usually a benefit to visual quality. Most viewers prefer views of large trees with open spacing.

The fuel treatments that would occur congruently with the harvest treatments include mechanical thinning, prescribed burning of the fuels, whole tree yarding, cut to length, grapple piling, and hand piling. These treatments would clean up the majority of the slash created by the harvest activities. The effects are primarily beneficial to the visual quality, reducing the visual impacts of human activities with a natural appearing landscape. Removal or burning of residual material (tree stumps, snags, limbs, and brush piles), removes the "clutter" that detracts from the remaining trees other scenic attributes. Most visual preference surveys indicate dislike for "messy" landscapes (Bradley 1996).

Pile burning and underburning would create scorched and blackened underbrush, saplings, bark, grasses and forbs. These effects would continue for 1 to 5 years. There is a possibility of the prescribed fire getting into the crowns of trees. This could cause a cluster of dead scorched trees. After the following growing season, the majority of the effects would no longer be visible as new growth of forbs and shrubs would quickly sprout. There may be some minimal long-term effects such as small patches of overstory mortality; however, the patches are not expected to detract from the landscape character.

Alternative 3 would authorize the most silvicultural treatments and activity fuels treatments within the Magone and County Road 18 foreground visual corridors and have the greatest short-term effects to visual quality, followed by alternatives 2 and 4. However, effects from these activities would be reduced under all alternatives by project design criteria (see Appendix C – Project Design Criteria). Alternatives 2 and 3 would authorize the most prescribed underburning, and alternative 4 the least.

Treatments would improve the long-term scenic integrity by opening the stands for increased visibility and visual diversity. Prescribed fire would improve conditions for fire resistant species, which would indirectly improve landscape character attributes of large tree character and open stands that can withstand low-intensity fires. This treatment would improve visuals into the forest understory from foreground views. Alternative 3 would see the greatest improvements with the most acres treated, followed by alternatives 2 and 4.

***Road activities***: Temporary road construction and temporarily opening closed roads (maintenance level 1) for log haul would be visible from some viewpoints. When these temporary roads are rehabilitated following use and maintenance level 1 roads (closed roads) temporarily opened for log haul are reclosed following logging, most of the visual impact would not be seen from open roads except for the berms and the first section of closed road. Alternative 3 would authorize the greatest number of temporary roads and the most temporary opening of closed roads for log haul within the Magone and County Road 18 foreground visual corridors and thus have the greatest visual affect, followed by alternatives 2 and 4.

Decommissioning FSR 1800-933 is the only proposed road system change that would take place within the Magone and County Road 18 foreground visual corridors. This road segment is already effectively grown in on the ground and so would not have visual effects.

***Recreation opportunity improvements***: Some of the proposed trails, the accessible trail development along Magone Lake, trailhead developments, interpretive signs, and docks and boat moorings would take place within the Magone and County Road 18 foreground visual corridors. In particular, improving a portion of the Magone Lake Trail to be accessible, placing interpretive signs, and modifying/replacing docks and boat moorings would be apparent to visitors to Magone Lake. However, these proposed activities would take place in previously disturbed areas. New trails would be less visually evident to viewers due to their narrow width and visual screening from vegetation in most areas. These activities would continue to meet the partial retention VQO, as activities would be evident to the viewer but visually subordinate to the surrounding landscape.

Alternative 3 would have the most visually evident recreation developments with the most miles of new trail construction, the most new trailheads, and the most modifications/replacements of docks and boat moorings. Alternative 3 would also designate OHV use on FSR 36 to where it intersects with 4 Corners; however, this is not expected to impact visual quality because it would be an additional activity on an already existing road. Alternatives 2 and 3 would both authorize development of the same number of interpretive signs.

Alternative 2 would have slightly fewer visually evident recreation developments with fewer miles of new trail construction, new trailhead developments, and the modifications/replacements of docks and boat moorings than alternative 3.

Alternative 4 would have the least visually evident recreation developments with the fewest miles of new trail construction and trailhead developments. Alternatives 2 and 4 would both authorize the same modifications/replacements of docks and boat moorings. This alternative would not authorize an accessible trail development along Magone Lake and would place no new interpretive signs.

***Magone Lake restoration activities***: Fish cribs and fish sticks would only be visible during the winter when they are installed on top of the ice. This would be a short-term effect over one winter season until the ice melts on Magone Lake. Fish cribs and sticks would sink to at least 5 feet below the water surface and would not be visually evident after that first winter they are placed. Alternatives 2 and 3 would place more fish cribs and sticks than alternative 4, and thus would have a greater visual impact during that first winter when they are visible.

It is expected that all of the treatments proposed in all of the action alternatives would meet the visual quality objectives of the Malheur Forest Plan. The impacts would not exceed the limits of visual impacts defined by maximum modification, modification and partial retention.

**Scenic Stability**

The scenic stability of the area is dependent on the conditions that favor resiliency to disturbances. Currently much of the area is outside of the historical range of variability in ways that put the forest at greater risk of uncharacteristic wildfire. Under all action alternatives the project planning area would receive treatments that would enhance the spatial/species diversity, scenic character attributes, and resilience of the forest canopy. These enhancements would include protection of large trees/old forest characteristics, as well as developing future large tree character and spatial/species diversity within the existing overly dense stands and plantations. Vegetation density within forest stands would be reduced through thinning and fuels reduction treatments that would create more attractive, open and structurally diverse conditions, favoring historically dominant species such as Douglas-fir, ponderosa pine, and western larch.

These more attractive, open, and diverse stand structure/species conditions would also considerably reduce the risk of scenery damaging ecosystem disturbances (pests, insects, disease, wildfires, etc.). More historical wildfire functions of the ecosystem would be established that would better perpetuate the Magone project planning area's attractive and historical "natural" scenic character attributes. With these reductions in ecosystem risk to the project planning area's vegetation scenery attributes, the scenic stability level would be transformed from the current low stability level (most vegetation attributes are threatened/absent) to the moderate level (most vegetation attributes are present and likely to be sustained). Alternative 3 would contribute the most toward scenic stability within the project planning because it would authorize the most silvicultural treatments, activity fuels treatments, and prescribed burning; alternatives 2 and 4 would also improve scenic stability, although to a lesser extent with fewer acres treated.

Road activities, recreation opportunity improvements, and Magone Lake restoration activities are not expected to contribute to or detract from scenic stability because they would not greatly alter the scenic character of the area.

### *Cumulative Effects*

The past, present and foreseeable activities that contribute to the cumulative effects to scenery resources range from the regeneration harvests, thinning, prescribed fire, and grazing practices that overlap in space and time with the activities proposed as part of the Magone Project. The timeframe for which these effects overlap ranges from the time of the activity through the life of the effect. The spatial bounding is the project boundary as the activities are visible from commonly used routes.

#### Past Activities

Past harvest activities have created long-term visual effects in the area that overlap in time and space with the Magone Project. Substantial timber harvesting that facilitated the removal of the large ponderosa pine, western white pine, western larch, and Douglas-fir (early seral species) in the Magone area began in the 1930s. Since then, late seral species have grown in these areas increasing stand densities. So, while perhaps not immediately apparent to the casual viewer, stands are denser and with a different species composition than would have been experienced historically.

In the recent past wildfires were actively suppressed leading to a buildup of ground fuels and overstocked stands. Because of current uncharacteristic fire behavior, all fires are being actively suppressed to reduce the chance of other major stand replacement fires. There have been minimal effects due to past wildfires; approximately 44 acres have been burned in the project planning area in recent years, which does not create significant cumulative effects to visual quality. The visual evidence of past fires is in keeping with what is naturally expected in a fire-dependent ecosystem.

#### Present Activities

***County Road 18 Healthy Forest Restoration Act Project*** – This project implemented approximately 1,200 acres of commercial thinning and 1,600 acres of precommercial thinning along County Road 18, including within the Magone project planning area. Prescribed burning along this corridor is ongoing. These treatments will not change the visual quality objective expected to be met by any of the three action alternatives. The scenic stability would remain the same as well.

***Recreation*** – Ongoing use of the Magone recreation area, dispersed camping, hunting, firewood gathering, and other recreational uses occurs year-round (with peak use from late May through November). The ongoing recreation activities are not expected to decrease the visual quality objectives that are associated with the Magone project planning area. The effects of ongoing recreation activities are accounted for in the existing visual quality objective.

***Grazing*** – Portions of seven allotments are currently permitted to graze within the Magone project planning area. The ongoing grazing activities are not expected to decrease the visual quality objective that is associated with the Magone project planning area. The effects of ongoing grazing activities are accounted for in the existing visual quality objective.

***Invasive Plant Treatments*** – Invasive plant treatments (primarily by hand pulling and grubbing) is currently being done. The invasive plant treatments are not expected to add substantial effects to the Magone project planning area to effect the visual quality objective achievement. Reduction in invasive plants is an effort that maintains the scenic stability of the herbaceous scenic attributes.

**Reasonably Foreseeable Future Activities**

***Invasive Plant Treatments*** – The Malheur National Forest Site-Specific Invasive Plants Treatment Record of Decision (USDA Forest Service 2015b) authorizes treatment of known and newly discovered non-native invasive plants potentially using herbicide, manual, mechanical, biological and/or cultural treatments. Invasive plant treatments are expected to improve the grassland composition, restoring areas, and cumulatively maintain visual quality and scenic stability.

***Aquatic Restoration Project Treatments*** – Potential projects that could be implemented under the 2014 Aquatic Restoration Decision include: fish passage restoration (e.g., replacement or removal of culverts), large and coarse woody debris placement along streams in the project planning area, removal/reduction of lodgepole encroachment, juniper and hawthorn removal, aspen stand enhancement, log weir and boulder modification, legacy floodplain structure removal, reduction of recreation impacts and road erosion control, maintenance and development of off-channel livestock watering facilities, riparian hardwood planting, riparian fencing, and beaver habitat restoration. These activities would maintain or improve the scenic integrity and stability of the affected areas.

This landscape would continue express the activities that occur as management, and other uses. The foreseeable activities that are planned to occur here would perpetuate a modified scenic expression of the landscape. It is expected that this expression would improve as the present and foreseeable actions are of a lighter or more sensitive approach to management than those of the past. The resiliency of the scenic attributes is expected to be improved as management activities are carried out to maintain the vegetation within the natural range of variation. These practices should improve scenic integrity and stability.

### 3.15.2.5 Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

*Forest Plan Objectives (pages IV-15 to IV-16)*

- Manage other specified forest and county roads with a lower emphasis on maintaining visual quality (sensitivity level II). Meet the visual quality objectives of foreground partial retention and middleground modification in these corridor viewsheds. The effects of management activities would be obvious in these middlegrounds. *This visual quality objective would be met in the Magone and County Road 18 visual corridors.*
- Emphasize horizontal diversity in the visual corridors (both sensitivity level I and II). This will be experienced as one moves through the corridor, not as vertical diversity on every acre. Create this by developing a sequence of visual experiences utilizing group selection harvest techniques applied to small treatment units (1/4 to 5 acres) in foregrounds… The effect is to have a multi-aged appearance… *Treatments proposed in the visual corridors would promote horizontal diversity along the corridor.*
- Manage unroaded areas and wilderness with sensitivity for the visual resource… Manage…semiprimitive motorized areas to meet the partial retention visual quality objective. *Treatments proposed in the Nipple Butte Inventoried Roadless Area (an unroaded semiprimitive motorized area) would meet the partial retention visual quality objective.*

*Forest-Wide Standards (page IV-27)*

- Forest-wide Standard 25: The minimum visual quality objective for the Forest is maximum modification. *This visual quality objective would be applied and met in the General Forest areas. Evidence of proposed harvest activities would be visible including skid trails, skyline corridors, temporary roads, and landings. Activities characteristic of surrounding areas.*
- Forest-wide Standard 27: Rehabilitate landscapes containing negative visual elements. *The Magone and County Road 18 visual corridors were impacted by harvest activities prior to the 1990 Malheur Forest Plan. Encouraging large-tree components, gap and clump structure, reduced surface and ladder fuels, and a more historical species composition would improve landscape visual elements over time.*

*Management Area Standards*

- Project activities would meet a visual quality objective of retention, partial retention, or modification for the visible and potentially visible areas (MA 14 Standard 2, page IV-108).
- Maintain visual corridors that overlap with big game winter range maintenance to achieve a minimum habitat effectiveness of 60 percent for elk. Refer to Management Area 4A standards (MA 14 Standard 5, page IV-108). See Wildlife section.
- Fish and wildlife improvement/maintenance projects are designed and would be implemented to meet visual quality objectives (see direct and indirect effects above) (MA 14 Standard 6, page IV-108).
- Timber harvest and related activities are designed to accomplish visual resource management objectives (see Appendix C – Project Design Criteria) (MA 14 Standard 9, page IV-109).

- Foreground areas would be managed to meet visual quality objectives (see direct and indirect effects above). Alternatives 2, 3, and 4 would benefit the health, resiliency, and visual appearances of the Magone and County Road 18 visual corridors (MA 14 Standard 11, page IV-109).
- No regeneration or overstory removal harvesting would occur in foreground of sensitivity level 1 and 2 corridors (MA 14 Standard 12, page IV-109).
- All middleground areas would be managed to meet visual quality objectives (see direct and indirect effects above) (MA 14 Standard 14, page IV-109).
- Horizontal diversity and multi-age appearance of vegetation would be maintained within visual corridors by maintaining a mix of thinned and unthinned areas (spatial complexity) and variable thinning densities (MA 14 Standard 16, page IV-109).
- Residues (i.e., fuels) would be managed to provide a natural-appearing landscape in visual corridors and to minimize visual effects (see Appendix C – Project Design Criteria) (MA 14 Standards 27 and 28, page IV-111).

# 3.16 Analysis Issue – Other Undeveloped Lands

## 3.16.1 Existing Condition

These acres of land have no history of harvest activity, do not contain forest roads, and are not designated as a wilderness area, identified as an inventoried roadless area, or included in the areas with wilderness characteristics inventory. They are stand-alone polygons of varying acreages all less than 5,000 acres within the project planning area.

There are no forest-wide or management area standards specific to other undeveloped lands in the Malheur Forest Plan; however, there are management areas that emphasize a non-motorized condition or prohibit harvest of timber. All lands, including other undeveloped lands, are managed consistent with forest-wide standards and guidelines and by designated Malheur Forest Plan management area allocations.

These acres of land have no history of harvest activity, do not contain forest roads, and are not designated as a wilderness area or identified as an inventoried roadless area. They are areas that have no obvious previous activity and are “leftover” areas from other analyses. For example, but not limited to, these areas may have been too steep, in between roads and harvest areas, or too wet. These areas may have values associated with them such as scenery and cultural resource values because of the lack of evidence of harvest or roads. These acres have no previous roads or harvest activities located in them.

Table 130 displays the acres of other undeveloped lands within the Magone project planning area. In the 27,000 acre Magone project planning area, approximately 3,900 acres have been identified as isolated polygons of other undeveloped lands, 10,000 acres are within the Nipple Butte IRA, and the remaining 13,100 acres are developed and managed (contain evidence of past harvest, mining, and/or forest roads). See Appendix B – Maps, Map 17. Additionally, there are 80 acres of public lands managed by the Bureau of Land Management and 960 acres of privately owned lands which were not included in this analysis. Individual polygons of other undeveloped lands less than 1 acre were eliminated from further study because no special or unique resource values were identified and the description of effects to individual pieces of land less than 1 acre are better disclosed as part of the other resource effects sections in this DEIS.

**Table 130. Magone project planning area inventory for other undeveloped lands**

| Land area | Acres |
|---|---|
| Acres inventoried for other undeveloped lands within the project planning area | 27,000 acres |
| Lands within the project planning area with evidence of past harvest, mining, developed recreation sites, and/or forest roads (including land within 300 feet of a forest road[1]). | 13,100 acres |
| Lands within an Inventoried Roadless Area | 10,000 acres |
| Other undeveloped lands (remaining acres with no evidence of past harvest and forest roads1 and/or not contained within an inventoried roadless area). | 3,900 acres |
| Bureau of Land Management managed public lands within the project planning area boundary | 80 acres |
| Private lands within the project planning area boundary | 960 acres |

[1]This includes roads of any maintenance level (i.e., maintenance level 1 or higher).

Table 131 displays the number, size class, and approximate acres of undeveloped lands present within the project planning area. Approximately 89 percent of the polygons are in the 1- to 100-acre size class. For perspective, one square mile is about 640 acres and the closest designated wilderness area (Strawberry Mountain) is over 68,700 acres. The residual shape of each undeveloped polygon is the result of boundaries created by past harvest, mining, developed recreation sites, and road building. The largest polygon of other undeveloped lands is approximately 640 acres.

**Table 131. Size class and acres of other undeveloped lands in the Magone project planning area**

| Size class | Number of polygons | Approximate acres |
|---|---|---|
| >1 acre | 49 (41%) | 3 acres |
| 1 to 20.0 acres | 39 (33%) | 284 acres |
| 20.1 to 100 acres | 18 (15%) | 768 acres |
| 100.1 to 200 acres | 7 (6%) | 870 acres |
| 200.1 to 400 acres | 5 (4%) | 1,364 acres |
| 400.1 to 1,000 acres | 1 (1%) | 640 acres |
| >1,000.1 acres | 0 | 0 acres |

The majority of the 3,900 acres of other undeveloped lands are allocated to Malheur Forest Plan management areas (MAs): General Forest and Range (MA 1 and 2), Middle Ground Visual Corridor (MA 14M), and Big Game Winter Range (MA 4A). All of these management areas allow timber management on a scheduled basis; all types of prescribed fire may be used to accomplish management objectives; and road construction, reconstruction, and maintenance are permitted within Malheur Forest Plan standards and guidelines. See Chapter 1 of this DEIS for a brief descriptions of goals, standards, and guidelines associated with each Malheur Forest Plan management area allocation located within Magone project planning area.

Other undeveloped lands include soils, water, fish and wildlife habitat that have not been directly impacted by past harvest, mining, and road building, or the impacts are not readily evident. Indirect impacts have and continue to occur due to fragmentation of vegetation. The current condition of soil; water; air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; noxious weeds; recreation; and cultural resources within the project planning area, including other undeveloped lands, are described elsewhere in Chapter 3 of this DEIS.

Human influences have had limited impact to long-term ecological processes within the other undeveloped lands. Disturbance by insects and fire has been and most likely would continue to be the factors with the most potential to impact the area. Opportunities for primitive recreation are limited to hiking, mostly cross-country, and hunting. Ongoing firewood gathering and removal of danger trees along forest roads that border each polygon changes the vegetation, leaves stumps, and presents a managed appearance within a developed transportation corridor.

Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of the polygon. Distance and topographic screening are also factors. The optimum shape and location to retain solitude and a sense of isolation from noise and sights of other humans and their activities would be at the center of a circle. Areas greater than or equal to 5,000 acres or about 8 square miles may have sufficient size to offer a sense of solitude, yet this may vary by individual. Long narrow shapes provide less distance from noise at their midpoint. Nearby, non-conforming sights and sounds of roads and timber harvest can be heard and often seen from within the 119 polygons of other undeveloped lands because they are all less than one square mile in size and none are a perfect circle in shape.

The existing condition of the remaining 13,100 acres of land in the project planning that are not found within an IRA or other undeveloped lands and affected by the project presents a landscape that has been managed and is generally developed in nature; these lands contain evidence of past harvest, active mining, and forest roads. Past management actions and current conditions within the 13,100 acres reflect the multiple-use intent and decisions made in the Malheur Forest Plan, and reflect consistency with management area allocations.

## 3.16.2 Environmental Consequences

### 3.16.2.1 Indicators for Assessing Effects

The analysis issues for assessing effects of each alternative and for comparing alternatives include values and features that characterize other undeveloped lands; and intrinsic biological, physical, and social values are shown in Table 132. The majority of the indicators are essentially the same as disclosed for areas of proposed project activities described elsewhere in this chapter and are not reiterated in this report.

**Table 132. Resource indicators and measures for assessing effects to other undeveloped lands**

| Objective | Indicator |
|---|---|
| Maintaining values and features that characterize other undeveloped lands | • Change in acres of other undeveloped lands<br>• Intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.)<br>• Intrinsic social values (apparent naturalness, solitude, remoteness) |

### 3.16.2.2 Methodology

The effects to other undeveloped lands were based on maps and polygons created using agency inventory procedures. These maps and polygons were created utilizing geographic information systems (GIS). The project planning area was evaluated for evidence of roads (open or closed, including a 300-foot buffer on each side of the road), prior timber harvest, mining, or development such as campgrounds.

Information regarding the effects of prior harvest, including previously harvested lands acquired by the Forest Service, was discussed and reviewed with the project silviculturist. Based on field review and professional judgement, these lands still show evidence of past harvest, including stumps and vegetation conditions outside those expected and reflective of historical, pre-harvest conditions. Therefore, formerly private lands acquired by the Forest Service from lumber companies were excluded from analysis as other undeveloped lands.

Individual polygons of other undeveloped lands less than 1 acre were eliminated from further study because no special or unique resource values were identified and the description of effects to individual pieces of land less than 1 acre are better disclosed as part of the other resource effects sections in this DEIS.

### 3.16.2.3 Spatial and Temporal Context for Effects Analysis

The scale of analysis is the Magone project planning area. The spatial contexts for this analysis are unit boundaries and the areas with the associated road activities. The temporal context for the effect analysis is long-term, 5 to 50 years. Road decommissioning, new road construction, and silviculture treatments would have a long-term effect and may result in more or less other undeveloped lands.

### 3.16.2.4 Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Past actions in or near the project planning area include timber management, wildland fuels management, fire suppression, mining, dispersed camping, firewood cutting, and road and facilities construction and maintenance. All activities have affected current forest composition, structure, and overall management infrastructure and developed lands of the area. Therefore, these activities are still reflected (with individual variances) in the current condition of the area's natural resource and human environment values.

### 3.16.2.5 Alternative 1 – No Action

#### *Direct and Indirect Effects*

Under alternative 1, there would be no direct or indirect effects to undeveloped lands because no activities would occur in these areas. The existing condition would remain unchanged, except by natural processes and ongoing management activities. Biological and ecosystem functions would continue. The landscape would likely continue developing complex fuel loads. A wildfire may burn more extensively and kill more trees within upland forest stands which would result in larger acreages of blackened landscapes compared to prescribed fires. All polygons of other undeveloped lands would continue to not be an inventoried roadless area, an area with wilderness characteristics, or a designated wilderness area.

#### *Cumulative Effects*

Because there would be no direct or indirect effects under alternative 1 due to taking no action, there would be no cumulative effects to other undeveloped lands.

### 3.16.2.6 Alternatives 2, 3, and 4

*Direct and Indirect Effects*

**Changes in acres in other undeveloped areas**

Under alternatives 2, 3, and 4, all acres of other undeveloped lands would continue to not be an inventoried roadless area or a designated wilderness area. Table 133 displays acres of proposed activities and miles of road activities that would occur under alternatives 2, 3, and 4. Table 134 displays a summary showing the changes in acres for other undeveloped lands under each action alternative. Acres changed from undeveloped to developed acres include commercial harvest units, non-commercial thinning units, and temporary road construction with a 200-foot buffer for any portion of these roads or buffers that lie outside of the commercial harvest units.

**Table 133. Acres of activities and miles of road proposed under alternatives 2, 3, and 4 that occur within other undeveloped lands in the Magone project planning area**

| Activities within other undeveloped lands | Alternative 2 | | Alternative 3 | | Alternative 4 | |
|---|---|---|---|---|---|---|
| | Distance (miles) | Size (acres)[1] | Distance (miles) | Size (acres)[1] | Distance (miles) | Size (acres)[1] |
| Silviculture treatments | n/a | 1,800 | n/a | 2,100 | n/a | 1,160 |
| Prescribed burning | n/a | 3,900 | n/a | 3,900 | n/a | 3,900 |
| New road construction | 0 | n/a | 0 | n/a | 0 | n/a |
| Road decommissioning[2] | 0.5 | 50 | 0.5 | 50 | 0.5 | 50 |
| Temporary roads (outside treatment units) | 1.0 | 48 | 1.0 | 48 | 1.0 | 48 |

[1] Acres of some activities overlap.

[2] Decommission roads are within developed areas. Decommissioning these roads adds acres to undeveloped lands.

**Table 134. Changes in other undeveloped lands in the Magone project planning area under alternatives 2, 3, and 4**

| Alternative | Other undeveloped acres after implementation | Acres changed (includes silviculture treatments and road activities) | Percentage of project planning area remaining as other undeveloped lands after implementation | Developed acres after implementation |
|---|---|---|---|---|
| 2 | 2,100 | -1,800 | 8% | 14,900 |
| 3 | 1,750 | -2,150 | 7% | 15,250 |
| 4 | 2,740 | -1,160 | 10% | 14,260 |

**Intrinsic physical and biological resources (soil, water, wildlife, recreation, fisheries, etc.)**

For other undeveloped lands within the Magone project planning area where activities proposed under alternatives 2, 3, and 4 would occur, the impacts to soil; water quality; air quality; forage; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources are essentially the same as disclosed for areas of proposed project activity described in other resource sections of this chapter and other resource reports and are not reiterated here.

**Intrinsic social values (apparent naturalness, solitude, remoteness)**

The following effects to other undeveloped lands are common to alternatives 2, 3, and 4.

Human influences have had limited impact to long-term ecological processes within these other undeveloped lands. Disturbance by insects and fire has been and most likely would continue to be the factors with the most potential to impact these areas. Silviculture treatments would increase the number of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. The lands would appear managed and developed. The sights, sounds, and changes in vegetation from harvest activities would further decrease the natural integrity and sense of naturalness within harvest units and along roads. All harvested units would remain forested after harvest although skid trails, stumps, and landings would be evident. Stand structure would change, therefore diversity of plant and animal communities may shift from current patterns but ecological diversity would remain (see Chapter 3, Level and Effects of Silviculture Treatments section). Impacts to natural integrity and sense of naturalness would likely be evident until stumps and vegetation canopies are no longer substantially recognizable (about 75 to 100 years). The sounds of timber harvest and road building machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long-term. Other impacts, such as tree marking paint and logging slash would be visible in the short-term (about 5 to 10 years). Impacts such as closed roads, skid trails, and tree stumps would be evident much longer.

Prescribed burning would change composition and structure of vegetation (Fire, Fuels, and Air Quality section) and the lands would appear managed and developed. For a few years burned areas would display a blackened color.

The sounds, smells, and possible sighting of mechanical activities and fuel treatment activities occurring in areas adjacent to the other undeveloped areas would reduce the sense of solitude and remoteness in the short-term, during project activities. Other sights and sounds of ongoing and previously approved activities in areas adjacent to the boundary of the other undeveloped areas would continue to have short-term effects on opportunities for solitude and remoteness. In the long-term there would be no change to the current availability of solitude or primitive recreation (see Fire, Fuels, and Air Quality section).

Proposed riparian restoration activities (e.g., riparian vegetation enhancement thinning and large woody debris placements) in other undeveloped lands would appear slightly altered in the short-term until the disturbance softens and becomes more natural appearing as time weathers the actions. The sights and sounds of machinery from the activity would reduce a sense of naturalness and solitude during project operations but would not persist in the long-term. Impacts such as tree stumps and large woody debris would be evident much longer. In the long-term, these areas would blend in with the surrounding landscape with more of the native vegetation and structure that were present historically.

Range water developments and fence construction would change the natural appearance of the immediate landscape and the lands would appear managed and developed. For a few years the immediate area of the water development and the fence right-of-way would appear clear of ground debris and stumps may be likely. Impacts to natural integrity and sense of naturalness would likely be evident until stumps and vegetation canopies are no longer substantially recognizable (about 75 to 100 years). These lands would not meet inventory criteria for areas with wilderness characteristics if the fencing exceeds 1 mile per section.

Proposed road activities in other undeveloped lands would reduce the size of the other undeveloped lands polygons. The lands would appear managed and developed. The sights, sounds, and changes in vegetation from associated road building and decommissioning and use would further decrease the natural integrity and sense of naturalness within harvest units and along roads. The sounds of road building machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long-term. Impacts such as closed roads, skid trails, and tree stumps would be evident much longer.

In the long-term the project would result in the development of historic open conditions characterized by larger diameter trees, though more stumps would be present. Treatments would provide an overall mix of size classes of trees for visual as well as biological diversity (see Level and Effects of Silviculture; Fire, Fuels, and Air Quality; and Visuals sections).

Opportunities for a feeling of solitude, the spirit of adventure and awareness, serenity, and self-reliance are limited by the size and shape of the polygon. Distance and topographic screening are also factors. The optimum shape and location to retain solitude and a sense of isolation from noise and sights of other humans and their activities would be at the center of a circle. Areas greater than or equal to 5,000 acres or about 8 square miles may have sufficient size to offer a sense of solitude yet this may vary by individual. Long narrow shapes provide less distance from noise at their midpoint. Nearby, non-conforming sights and sounds of project activities can be heard and often seen from within the polygons of other undeveloped areas because they are all less than 1 square mile in size and none is a perfect circle in shape. The existing condition of all remaining acres with evidence of past harvest and forest roads of land within and affected by the Magone Project presents a landscape that has been managed and is generally developed in nature. Past management actions and current conditions within these areas reflect the multiple-use intent and decisions made in the Malheur Forest Plan, as amended, and reflect consistency with forest plan management area allocations.

Other undeveloped lands with no proposed activities would still be classified as other undeveloped lands and would retain their intrinsic social values as described in the affected environment. They would remain free of developments such as forest roads or timber harvest stumps. All acres of other undeveloped lands within the project planning area would still not be considered an inventoried roadless areas or a designated wilderness area. These undeveloped lands would remain as small scattered areas detached from each other by terrain, roads, and harvest activities.

### *Cumulative Effects*

For other undeveloped lands in which project activities would occur when combined with past, present, and reasonably foreseeable future actions, where project activities would occur, cumulative effects to soils; water quality; air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources as disclosed elsewhere in this chapter and in the specialist reports and are not reiterated here.

Under alternatives 2 and 3, silvicultural treatments would increase the numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. In the long-term (about 50+ years), alternatives 2 and 3 would result in the development of historic open conditions characterized by larger diameter trees, though more stumps would be present than currently exist. Fuels treatments and future wildfires would cumulatively change the composition and structure of vegetation which could affect some forest visitor’s sense of naturalness and remoteness.

For a few years burned areas would display a blackened color. Outside of the burned areas, the conditions described in the affected environment would remain unchanged except by natural processes and ongoing management activities such as grazing and hunting.

Apparent naturalness, solitude, and remoteness would be cumulatively impacted by grazing, dispersed camping, and motorized vehicle use on open system roads and trails under all action alternatives. Effects associated with recreational use, including noxious weed spread, hunting, fishing, erosion, litter, and evidence of fire rings, are expected to remain cumulatively minor. Ongoing removal of hazard trees along forest roads and recreation trails changes the vegetation but does not change the overall sense of naturalness or sense of solitude along an existing developed transportation corridor. Overall, cumulative effects from these activities on apparent naturalness, solitude, and remoteness is very small (not measurable/indistinguishable) in proportion to the changes anticipated from the direct and indirect effects of the alternatives disclosed above.

# 3.17 Analysis Issue – Climate Change

## 3.17.1 Existing Condition and Analysis Methods

The Forest Service does not have a national policy or guidance for managing carbon, and the tools for estimating carbon and sequestration are not fully developed. Current direction for addressing climate change issues in project planning and the NEPA process is provided in the document Climate Change Considerations in Project Level NEPA Analysis (USDA Forest Service 2009c). This document outlines the basic considerations for assessing climate change in relation to project-level planning.

Ongoing climate change research was summarized in reports by the United Nations Intergovernmental Panel on Climate Change (www.ipcc.ch), US Climate Change Science Program's Science Synthesis and Assessment Products and the US Global Change Research Program. These reports concluded that climate is already changing; that the change will accelerate, and that human greenhouse gas emissions, primarily carbon dioxide ($CO_2$) emissions, are the main source of accelerated climate change.

Because greenhouse gases mix readily into the global pool of greenhouse gases, it is not currently possible to ascertain the indirect effects of emissions from single or multiple sources (projects). In addition, because the large majority of Forest Service projects are extremely small in the global atmospheric $CO_2$ context, it is not presently possible to conduct quantitative analysis of actual climate change effects based on individual or multiple projects.

This analysis considers two types of climate change effects. One is the effects of the proposed project on climate change. The second is the effect of climate change on the proposed project.

## 3.17.2 Direct and Indirect Effects

### 3.17.2.1 Effects of the Alternatives on Climate Change

Climate change, as measured by greenhouse gas emissions, primarily carbon dioxide, was assessed for this project. Proposed activities that would cause carbon emissions are prescribed burning and harvest operations. Proposed activities that would cause carbon sequestration are harvesting of forests and conversion of trees into long-lived products or replacing fossil fuel use with biomass.

The reduced risk of large-scale stand replacement wildfires would lead to a reduction in carbon emissions from the forest both from the immediate consumption during the fire and later as unsalvaged wood decays and releases carbon.

Although it is possible to quantify a project's direct effects on carbon emissions, there is no certainty about the actual intensity of individual project's indirect effects on global climate change. Uncertainty in climate change effects is expected because it is not possible to meaningfully link individual project actions to quantitative effects on climatic patterns.

Under the no action alternative, there would be an increased indirect risk of wildfire, which could contribute carbon dioxide emissions. The fuels that have accumulated are prone to be released back into the atmosphere by combustion and decay.

Under the action alternatives, up to 28,500 acres (under alternatives 2 and 3) and up to 17,200 acres (under alternative 4) are proposed for underburning. Underburning would release carbon dioxide into the air from the debris on the forest floor, but repeated underburns would produce substantially less emissions per acre than a wildfire, which consumes material from both the forest floor and the standing trees. Restoration of the forest by moving toward the historical range of variability, through thinning, would result in a low risk of uncharacteristically severe wildfire. This reduced risk has a direct beneficial effect of decreased carbon emissions from these acres because the risk of acres being burned by uncharacteristically severe wildfires would be reduced.

The action alternatives are not expected to have a measurable change in the ability of the forest to sequester carbon. Thinning would reduce the number of trees, but the number of remaining trees left would still utilize most of the growing potential of the site with net growth remaining about the same. Harvesting wood and turning it into durable products such as lumber would sequester a portion of the carbon while retaining the capacity of the forest to absorb carbon from the atmosphere. Additionally, biomass utilization is itself a carbon neutral source of energy, but if it is replacing fossil fuel use there is a net reduction in atmospheric carbon.

Overall, the combined effects of any of the action alternatives are expected to be a net reduction in atmospheric carbon.

#### 3.17.2.2 Effects of Climate Change on Magone

Eastern Oregon is likely to experience changes in temperature and rainfall patterns with rising greenhouse gas levels. The mean temperature at the end of this century is projected to increase several degrees Fahrenheit, with the largest increase occurring during the summer months (June–August), though each season has predicted higher average temperatures. Potential future average annual precipitation at the end of this century is projected to increase, though the summer (June–August) precipitation is to decrease. Most future climate scenarios show increased precipitation for the Pacific Northwest, but with longer periods of summer drought.

The higher average temperatures and increased summer drought predicted by climate change models may lead to vegetation changes in the analysis area. Evidence also shows that long drought periods can lead to increased insect and disease activity, as well as increased wildfire activity and intensity.

Under the no action alternative the species composition and stand density would remain the same or trend toward late seral species and increased stand density. This would intensify any effects from increased summer temperatures and drought, leading to increased stress to the trees and reduced ability to resist insects and disease in the forest. Increased fuel loadings and warmer, drier weather would increase the risk of large stand replacement wildfires.

Under the action alternatives there are varying levels of silvicultural treatments including commercial thinning, non-commercial thinning, post and pole removal, conifer reduction in aspen stands, and biomass removal. Thinning would reduce forest density and improve the health and vigor of remaining trees, especially during periods of summer drought. A forest that is better adapted to handle disturbances, such as wildfire or disease, would be more resilient in the face of potential climate change in the future.

Additionally, complete quantifiable information about project effects on global climate change is not currently possible and is not essential to a reasoned choice among alternatives.

### 3.17.3 Cumulative Effects

As greenhouse gas emissions are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with any number of particular projects. Nor is it expected that such disclosure would provide a practical or meaningful effects analysis for the Magone Project.

## 3.18 Evaluation of Proposed Forest Plan Amendments

### 3.18.1 Forest Plan Background

The Malheur Forest Plan was authorized on May 25, 1990. The Malheur Forest Plan provides a long-range strategy for managing the Malheur National Forest. Through standards the plan provides rules that govern resource management practices Forest-wide and for each management area. Management areas are geographic areas established by the Malheur Forest Plan that have similar management objectives and common management prescriptions.

On May 20, 1994, the Regional Forester signed a decision notice establishing interim management direction for riparian, ecosystem, and wildlife standards for timber sales for eastside forests. On June 5, 1995, the Regional Forester signed a decision replacing the 1994 versions of each standard as adopted on May 20, 1994. This revised interim direction is referred to as Regional Forester’s Forest Plan Amendment 2. The intent of this decision was to amend eastside forest plans until the Interior Columbia Basin Ecosystem Management Project was completed, which was to amend forest plans to reflect new scientific information related to fish and wildlife habitat in terms of snags and old growth. The planning for the Interior Columbia Basin Ecosystem Management Project was controversial and eventually the Chief made the decision to issue a proposed decision in December 2000, which would describe the science findings and management recommendations. This did not amend the eastside forest plans; therefore direction in Regional Forester’s Forest Plan Amendment 2 still guides management of the Malheur National Forest.

## 3.18.2 Evaluation of Proposed Forest Plan Amendments

Under the 2012 Planning Rule (Title 36, CFR, Part 219–Planning) it states:

> 36 CFR 219.13(a) *Plan amendment*. A plan may be amended at any time. Plan amendments may be broad or narrow, depending on the need for change, and should be used to keep plans current and help units adapt to new information or changing conditions. The responsible official has the discretion to determine whether and how to amend the plan. Except as provided by paragraph (c) of this section, a plan amendment is required to add, modify, or remove one or more plan components, or to change how or where one or more plan components apply to all or part of the plan area (including management areas or geographic areas).

The amendment process as described at 36 CFR 219.13(b) is:

> (1) Base an amendment on a preliminary identification of the need to change the plan. The preliminary identification of the need to change the plan may be based on a new assessment; a monitoring report; or other documentation of new information, changed conditions, or changed circumstances. When a plan amendment is made together with, and only applies to, a project or activity decision, the analysis prepared for the project or activity may serve as the documentation for the preliminary identification of the need to change the plan;
>
> (2) Provide opportunities for public participation as required in §219.4 and public notification as required in §219.16. The responsible official may combine processes and associated public notifications where appropriate, considering the scope and scale of the need to change the plan; and
>
> (3) Amend the plan consistent with Forest Service NEPA procedures. The appropriate NEPA documentation for an amendment may be an EIS, EA, or CE, depending upon the scope and scale of the amendment and its likely effects. A proposed amendment that may create a significant environmental effect and thus require preparation of an EIS is considered a significant change in the plan for the purposes of NFMA.

### 3.18.2.1 Changes to Old Growth Boundaries

#### *Amendment and Rationale*

The Malheur Forest Plan standards for old growth habitats are identified for Management Area 13 (USDA Forest Service 1990a, page IV-105 to IV-107; USDA Forest Service 1990b, Appendix G). Direction in these sections is to distribute old growth across the Malheur National Forest to provide for wildlife species dependent on these lands including pileated woodpecker and pine marten. Acres in Management Area 13 include both designated old growth and replacement old growth.

Malheur Forest Plan Management Area 13, Standard #4 states, “Inventory and validate all old growth areas. Correct previously dedicated old growth unit designations that are not meeting management requirement direction where possible. Utilize the interdisciplinary process to develop recommendations for boundary adjustments, or unit relocation” (USDA Forest Service 1990a, page IV-105).

All or parts of eight (8) dedicated old growth areas (DOGs) are located in the Magone project planning area. However, three of these DOGS are located along the project boundary with few acres actually within the project planning area. All of these DOGs lack replacement old growth areas (ROGs) and pileated woodpecker feeding areas (PWFAs).

Most of the designated DOGs provide highly suitable habitat for pileated woodpeckers and occupancy has been documented in those DOGs. However, intensive remote camera surveys for pine marten were conducted in many of the DOGs and other suitable old-forest habitat and pine marten occurrence was not documented. Even within pine marten DOGs and modeled pine marten habitat, most habitat is marginal and adequate connectivity to more suitable and occupied habitat does not currently exist.

Management Area 13, Standard #5 states to, "Locate replacement old growth areas within ¼ mile of dedicated old growth areas. Provide old growth replacement areas that are one-half the size of its corresponding dedicated old growth unit. Refer to FEIS Appendix G for stand type, size and distribution criteria" (USDA Forest Service 1990a, page IV-105).

The proposed forest plan amendment would redraw Management Area 13 boundaries for three existing DOGs, create two pine marten ROGs, and create three pileated woodpecker ROG/PWFAs within the project planning area to bring total acres up to Malheur Forest Plan habitat, size, and distribution requirements for alternatives 2, 3, and 4. The proposed DOG and ROG/PWFAs would be located within suitable late and old structure stands. There would be net loss of approximately 312 acres of dedicated old growth, but an overall expansion of approximately 1,067 acres of the MA-13 network including DOGs and ROG/PWFAs. Table 135 compares the existing old growth habitats set aside within the project planning area with the proposed changes in relation to Malheur Forest Plan standards. Specifically:

- DOG 03115PW – This DOG would be relocated to more suitable old-growth habitat for pileated woodpeckers. Further, a 455-acre ROG/PWFA would also be designated adjacent to the new DOG boundary. The 326 acres where the DOG is currently designated does not exhibit old-growth characteristics and would be treated in alternatives 2 and 3 to promote increased growth and resiliency for desired species, and to move the stand towards LOS forest. Under alternative 4, location and boundary proposals would be consistent; however, no treatment would take place. This stand also contains many mistletoe-infested trees that would be deferred from harvest to retain important habitat for blue grouse and other wildlife species. This stand would be re-designated as ROG for DOG03114PW.
- DOG 03114PW – There would be no change in the original DOG acres or boundary for this stand. The currently designated DOG03115PW would be designated as ROG/PWFA for this DOG. An additional 61 acres would be added to this ROG/PWFA for a total of a 327-acre ROG/PWFA.
- DOG03119PW – Three-hundred (300) acres of the existing 403 acres would remain designated as DOG03119PW. The remaining 103 acres, combined with an additional adjacent 204 acres would be designated as ROG/PWFA. The splitting of this DOG and adding additional acres to the ROG would be specifically for the purpose of expanding the MA-13 network and meeting Malheur Forest Plan standards.
- DOG03515MM – No boundary or location alterations would be proposed. However, the existing 434-acre DOG would be split to include a 237-acre DOG and a 197-acre ROG to meet Malheur Forest Plan standards.
- DOG03259 – There would be no change in existing DOG location or size. An additional 87-acre ROG would be designated for this stand.

**Table 135. Comparison of existing dedicated old growth (DOGs), replacement old growth (ROGs), and pileated woodpecker feeding areas (PWFAs) with proposed changes for alternatives 2, 3, and 4, in relation to Malheur Forest Plan standards**

| Old growth management areas | Minimum MA-13 acre requirements | Existing acres in the project planning area | Adjusted (proposed) acres for alternatives 2, 3, and 4 |
|---|---|---|---|
| DOG 03318 (318) Pine Marten/Pileated (PP)[1] | 300 | 5.8 | 5.8 |
| Replacement area (ROG) | 150 | 0 | 0 |
| Feeding area (PWFA) | 300 | 0 | 0 |
| DOG 03259 (259) Pine Marten (MM) | 160 | 285 | 285 |
| Replacement area (ROG) | 80 | 0 | 86 |
| DOG 03260 (260) Pine Marten (MM)[1] | 160 | 7 | 7 |
| Replacement area (ROG) | 80 | 0 | 0 |
| DOG 03515 (515) Pine Marten (MM) | 160 | 434 | 237 |
| Replacement area (ROG) | 80 | 0 | 197 |
| DOG 03114 (114) Pileated Woodpecker (PW) | 300 | 322 | 322 |
| Replacement area (ROG) | 150 | 0 | 327 |
| Feeding area (PWFA) | 300 | 0 | 327[2] |
| DOG 03115 (115) Pileated Woodpecker (PW) | 300 | 326 | 314 |
| Replacement area (ROG) | 150 | 0 | 455 |
| Feeding area (PWFA) | 300 | 0 | 455[2] |
| DOG 03119 (119) Pileated Woodpecker (PW) | 300 | 403 | 300 |
| Replacement Area (ROG) | 150 | 0 | 307 |
| Feeding area (PWFA) | 300 | 0 | 307[2] |
| | **DOGS** | **1,788** | **1,476** |
| **TOTALS:** | **ROGS** | **0** | **1,372** |
| | **PWFAs** | **0** | **1,089[2]** |

[1] Most of these DOGs are located outside of the project planning area and will be adjusted in future projects.

[2] PWFAs are not added to the total estimated acreages because all additional acres were designated as ROG and assumed to include PWFAs.

### *Direct, Indirect, and Cumulative Effects*

The 1990 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 (ROD-24). Since 1990, there have been 31 amendments that have affected the location and acreage of old growth areas. 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 amendments, there are currently approximately 74,297 acres of mapped dedicated old growth (DOG) and replacement old growth (ROG) on the Forest with a MA-13 designation outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers. Additional old-growth habitat exists on the Malheur National Forest in other management allocations that are distributed across the Forest.

This proposed forest plan amendment would redraw MA-13 boundaries for existing areas and delineate boundaries for new areas within the project planning area to bring total acres up to Malheur Forest Plan standards for alternatives 2, 3, and 4. There would be an overall expansion of the MA-13 network.

DOGs would decrease by approximately 312 acres and ROG/PWFAs would increase by 1,372 acres, resulting in approximately 75,357 acres of mapped DOGs and ROG/PWFAs on the Forest with a MA-13 designation outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers.

Reasonably foreseeable future projects which could include forest plan amendments to Management Area 13 include the Camp Lick Project on the Blue Mountain Ranger District, the Summit Project on the Prairie City Ranger District, and the Dove and Flat projects on the Emigrant Creek Ranger District. These projects, combined with the Magone Project, could increase the number of forest plan amendments to Management Area 13, and increase the acres of mapped DOGs and ROG/PWFAs on the Forest with a MA-13 designation outside of wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers; more information will be available on if a forest plan amendment to Management Area 13 is going to be proposed under these projects when the Magone Final Environmental Impact Statement is released.

### 3.18.2.2 Reduce Summer Range, Winter Range, and Wildlife Emphasis Area (Management Area 21) Cover below Malheur Forest Plan Standards

*Amendment and Rationale*

Although HEI and cover requirements are meeting or exceeding Malheur Forest Plan standards, cover requirements are not always compatible with the historical range of variability. This conflict is apparent in Hot Dry and Warm Dry forests dominated by ponderosa pine. Historical conditions and fire return intervals favored large blocks of trees with canopy closure too low to support satisfactory or marginal cover. Today, cover requirements are being met on many ponderosa pine sites; however, stands are overstocked and at high risk to bark beetle and severe wildfires. Cover levels may not be sustainable. This inherent conflict may be even more relevant in winter range, which is often located in low elevation, Hot Dry and Warm Dry forests dominated by ponderosa pine. Unfortunately, tree thinning, the treatment that most effectively reduces beetle and fire risk, also reduces the effectiveness of a stand as cover.

**Alternative 2**

An amendment is proposed to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover below the Malheur Forest Plan standard of 12 percent in the Grub Creek subwatershed. Alternative 2 would reduce satisfactory cover from the existing 31.8 to 10.1 percent.

An amendment is proposed to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) to reduce winter range satisfactory cover below the Malheur Forest Plan standard of 10 percent in the Grub Creek subwatershed. Alternative 2 would reduce satisfactory cover from the existing 29.5 to 5.9 percent.

An amendment is proposed to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) to reduce satisfactory cover below the Malheur Forest Plan standard of 20 percent and total cover below the standard of 40 percent in the Nipple Butte WEA. Alternative 2 would reduce satisfactory cover from the existing 46.8 to 16.5 percent and total cover from the existing 70.6 to 39.5 percent.

This amendment would apply only for the duration of, and those actions proposed in, the site-specific Magone Project.

**Alternative 3**

An amendment is proposed to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) to reduce summer range satisfactory cover below the Malheur Forest Plan standard of 12 percent in the Grub Creek subwatershed. Alternative 3 would reduce satisfactory cover from the existing 31.8 to 8.2 percent.

An amendment is proposed to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) to reduce winter range satisfactory cover below the Malheur Forest Plan standard of 10 percent and total cover below the standard of 25 percent in the Grub Creek subwatershed. Alternative 3 would reduce satisfactory cover from the existing 29.5 to 3.3 percent and total cover from the existing 87.4 to 17.1 percent in the Grub Creek subwatershed.

An amendment is proposed to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) to reduce satisfactory cover below the Malheur Forest Plan standard of 20 percent and total cover below the standard of 40 percent in the Nipple Butte WEA. Alternative 3 would reduce satisfactory cover from the existing 46.8 to 16.6 percent and total cover from the existing 70.6 to 39.3 percent.

This amendment would apply only for the duration of, and those actions proposed in, the site-specific Magone Project.

**Alternative 4**

No amendment to Forest-wide standard 28 (USDA Forest Service 1990a, page IV-28) is proposed under alternative 4.

No amendment to Management Area 4A, Standard 4 (USDA Forest Service 1990a, page IV-70) is proposed under alternative 4.

No amendment to Management Area 21, Standard 4 (USDA Forest Service 1990a, page IV-131 to IV-132) is proposed under alternative 4.

### *Direct, Indirect, and Cumulative Effects*

**Summer Range**

Within the Magone project planning area there are approximately 13,733 acres of summer range in the East Fork Beech Creek subwatershed portion of the project planning area, and about 1,269 acres of summer range in the Grub Creek subwatershed portion of the project planning area. Total cover, marginal cover, and satisfactory cover all exceed Malheur Forest Plan standards. Any of the action alternatives would maintain the overall habitat effectiveness for each subwatershed in summer range at or above Malheur Forest Plan standards. See Wildlife section for more information.

***Direct and indirect effects of alternative 1 (no action)*** – With no activities proposed, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards in the short-term. With no thinning or prescribed fire, increased tree stocking could increase the frequency and intensity of high-severity wildfire events.

A fire of moderate to intense magnitude and severity could convert late and old structure or multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, therefore changing forage:cover ratios and distribution across the project planning area. However, with proportionate changes in ratios, HEI values would not be expected to fall below Malheur Forest Plan standards.

***Direct and indirect effects of alternatives 2 (proposed action) and 3*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards except for satisfactory cover in the Grub Creek subwatershed. Satisfactory cover would be 10.1 percent (under alternative 2) and 8.2 percent (under alternative 3) compared to the Malheur Forest Plan standard of 12 percent. However, cover distribution would likely be better than the model can predict due to the leave patches and design of the variable density thinning treatment. This would leave numerous patches providing cover distribution.

Following the completion of implementation of vegetation treatments proposed in alternatives 2 and 3 (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Most lost vertical cover would be recovered quickly and both forage and cover quality and quantity would be expected to increase substantially. Satisfactory cover would be expected to meet or exceed Malheur Forest Plan standards in Grub Creek in the short- to mid-term as marginal cover moved to satisfactory and additional cover through regeneration and increased vigor would be added.

***Direct and indirect effects of alternative 4*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards, although size and spacing (distribution) of cover would be reduced in some areas.

***Cumulative effects*** – Since the Forest Plan was signed in 1990, there have been seven (7) amendments that have affected big game summer range cover. Most amendments allowed reductions of satisfactory cover below forest plan standards. A few amendments allowed reductions of marginal cover or total cover within summer range.

The Malheur Forest Plan directs that cover determinations for site specific projects be calculated at a subwatershed basis. Subwatershed boundaries across the Forest have been adjusted since some of these amendments were authorized. Typically subwatershed boundaries have increased in size from those that existed when amendments were approved in the 1990s. Currently there are 178 subwatersheds with portions of big game summer range on the Malheur National Forest. In total there are 1,338,781 acres of summer range within these subwatersheds (not all acres are on the Malheur National Forest). Using the current subwatershed boundaries, amendments were approved within portions of 13 individual subwatersheds containing 133,905 acres of summer range. The 13 subwatersheds contain approximately 10 percent of the big game summer range within the 178 subwatersheds. This is likely an overestimate of the percentage summer range on the Malheur National Forest that has been impacted by amendments because of the adjustments in subwatershed boundaries since the Malheur Forest Plan was approved.

Areas where amendments were approved within summer range are well distributed across the Malheur National Forest. Three of the amendments were located in the Silvies summer range, one in the Malheur River summer range, one in the Upper John Day summer range, and one in the Middle Fork John Day summer range.

Two of the projects (Olmstead and Silvies Canyon) had authorized amendments that were completed over 10 years ago. Table 136 shows specific details regarding past amendments for summer range cover.

**Table 136. Forest plan amendments affecting big game summer range since 1990**

| Project | District and summer range | Decision date | Amendment rationale | Scale of amendment | Current subwatersheds and acres of summer range |
|---|---|---|---|---|---|
| Prater Planning Area | Emigrant Creek, North Basin | 1995 | | Allowed to be below winter range cover standards in both Prater/Coffeepot Creek subwatershed. | Armstrong Canyon -23 acres<br>Coffeepot Creek-1,463 acres |
| Badger Timber Sale | Emigrant Creek, Silvies | 1997 | | Reduced cover summer range in the West Fork Hay Creek subwatershed. | Hay Creek – 20,962 acres |
| Olmstead Vegetation and Road Management Analysis | Prairie City, Upper John Day | 1/29/2001 | 337 acres will lose marginal cover canopy closure due to commercial thinning. This is relatively minor compared to the 5,787 acres that is currently meeting marginal cover standards (a reduction of 8%). The effects of activities are primarily within the next 5 to 20 year time frame. Old Forest structures would develop with these treatments. | Commercially thin approximately 337 acres of marginal cover in the Phipps subwatershed. This reduces total cover to 17%. The Forest Plan requires big game summer range to provide 20% total cover. | Mill Creek-Middle Fork John Day – 16,652 acres |
| Silvies Canyon | Emigrant Creek, Silvies | 8/4/2003 | The areas selected for commercial thinning treatments had high tree densities, increasing the risk of stand replacing fire events and insect outbreak.<br>The canopy cover that will develop is expected to be more sustainable because it will be provided by fewer, but larger and healthier trees that are more adapted to site conditions than those there presently. | Total cover in summer range below standards and guidelines in Boulder/Fawn, Sagehen Creek, Myrtle, Stancliffe Creek subwatersheds. | Stancliffe Creek-Silvies River – 6,934 acres<br>Sagehen Creek-Silvies River-7,540 acres<br>Myrtle Creek-20,362 acres |
| Soda Bear | Blue Mountain, Silvies | 1/6/2012 | To address the purpose and need of reducing the fire hazard and the severity of mountain pine | Reduction of satisfactory cover below the Forest Plan | Lower Bear Creek- 3,697 acres<br>Middle Bear |

| Project | District and summer range | Decision date | Amendment rationale | Scale of amendment | Current subwatersheds and acres of summer range |
|---|---|---|---|---|---|
| | | | beetle outbreak. Commercial and precommercial thinning was proposed to reduce ladder and canopy fuels and increase the ecological resiliency of stands to insects by reducing tree densities (canopy closure). The Soda Bear project area is primarily a dry forest landscape and retaining canopy closures greater than 50 percent within these dry forest types would not meet the purpose and need. | standard in the Lower Bear Creek (4.3%), middle Bear Creek (4.8%) and Soda Valley (2.9%) subwatersheds. Total cover will be reduced to 14.3% in the Soda Valley subwatershed. | Creek- 11,030 acres<br>Soda Valley-Silvies- 5,878 acres |
| Galena | Blue Mountain, Middle Fork John Day | 9/10/2013 | To meet the purpose and need, the project was designed to restore forested lands within the project area to more closely resemble the historic range of variability of species composition, density, and stand structure, especially within the warm dry and hot dry biophysical environments; and to reduce surface fuel loads, ladder fuels and crown density resulting in reducing the potential for large, stand replacing crown fires. | Satisfactory cover for the summer range in the Vinegar Creek subwatershed is currently 8.2%, which is below the Forest Plan standard of 12%, and would further be reduced to 7.3%. The proposed action would reduce satisfactory cover within big game summer range on 128 acres within the subwatershed. | Vinegar Creek – Middle Fork John Day |
| Upper Pine | Emigrant Creek, Malheur River | 9/23/2013 | To address the purpose and need, the project was designed to reduce fuels, to alter fire behavior and move the area towards historical fire behavior (low intensity surface fires) and fire regime (frequency) with historical effects on vegetation (from high mortality to low mortality). | Satisfactory cover in the Upper Pine Creek subwatershed will be reduced from 5% to 3.3%. | Upper Pine Creek- 21,385 acres |

The Magone Project would be the eighth forest plan amendment that allows a reduction of summer range satisfactory, marginal, or total cover below forest plan standards in the 25 years since the Malheur Forest Plan was approved. The Magone Project would increase the number of subwatersheds where cover amendments have been approved to 13 out of the 178 subwatersheds that contain big game summer. Approximately 13 percent of the big game summer range acres are contained within the 13 subwatersheds.

The Malheur Forest Plan Record of Decision (USDA Forest Service 1990c, page 13) authorized different cover standards for seven summer range watersheds. The Magone Project would be the second project to authorize a summer range amendment in the Upper John Day summer range.

The Camp Lick, Dove, Flat, and Summit projects on the Malheur National Forest are currently in the planning stages and some of these projects could include a cover amendment in big game summer range; more information will be available on if a cover amendment is going to be proposed under these projects when the Magone Final Environmental Impact Statement is released.

**Winter Range**

Within the Magone project planning area there are approximately 9,207 acres of winter range in the East Fork Beech Creek subwatershed portion of the project planning area, and about 2,877 acres of winter range in the Grub Creek subwatershed portion of the project planning area. In all winter range in the project planning area, the habitat effectiveness index (HEI) values exceeds the Malheur Forest Plan standards; however, the HEI value is just below standards in winter range in the Grub Creek subwatershed. Any of the action alternatives would maintain the overall habitat effectiveness for each subwatershed in summer range at or above Malheur Forest Plan standards. See Wildlife section for more information.

***Direct and indirect effects of alternative 1 (no action)*** – With no activities proposed, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards in the short-term. With no thinning or prescribed fire, increased tree stocking could increase the frequency and intensity of high-severity wildfire events. A fire of moderate to intense magnitude and severity could convert late and old structure or multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, therefore changing forage:cover ratios and distribution across the project planning area. However, with proportionate changes in ratios, HEI values would not be expected to fall below Malheur Forest Plan standards.

***Direct and indirect effects of alternative 2 (proposed action)*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards except for satisfactory cover in the Grub Creek subwatershed; satisfactory cover would be 5.9 percent compared to the Malheur Forest Plan standard of 10 percent. However, cover distribution would likely be better than the model can predict due to the leave patches and design of the variable density thinning practice. This would leave numerous patches providing cover distribution.

Following the completion of implementation of vegetation treatments proposed in alternative 2 (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Most lost vertical cover would be recovered quickly and both forage and cover quality and quantity would be expected to increase substantially.

Satisfactory cover would be expected to meet or exceed Malheur Forest Plan standards in Grub Creek in the short- to mid-term as marginal cover moved to satisfactory and additional cover through regeneration and increased vigor would be added.

***Direct and indirect effects of alternative 3*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards except for satisfactory and total cover in the Grub Creek subwatershed; satisfactory cover would be 3.3 percent compared to the Malheur Forest Plan standard of 10 percent, and total cover would be 17.1 percent compared to the Malheur Forest Plan standard of 25 percent. However, cover distribution would likely be better than the model can predict due to the leave patches and design of the variable density thinning practice. This would leave numerous patches providing cover distribution.

Following the completion of implementation of vegetation treatments proposed in alternative 3 (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Most lost vertical cover would be recovered quickly and both forage and cover quality and quantity would be expected to increase substantially. Satisfactory cover would be expected to meet or exceed Malheur Forest Plan standards in Grub Creek in the short- to mid-term as marginal cover moved to satisfactory and additional cover through regeneration and increased vigor would be added.

***Direct and indirect effects of alternative 4*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards, although cover and size and spacing (distribution) of cover would be reduced in some areas.

***Cumulative effects*** – Since the Malheur Forest Plan was authorized 25 years ago, there have been 14 amendments that have affected big game winter range cover. Most amendments reduced total or satisfactory cover below forest plan standards. Areas where amendments were approved within winter range are well distributed across the Malheur National Forest. Nine of the projects where amendments in big game winter range were authorized were implemented in the 1990s (Table 137).

Table 137 and show specific details regarding past amendments for winter range cover.

**Table 137. Forest plan amendments affecting big game winter range from 1990 to 1999**

| Project | District and summer range | Decision date | Amendment rationale |
|---|---|---|---|
| Jungle Timber Sale | Blue Mountain, Middle Fork John Day | 1990 | Modified wildlife cover standard (from 10% to 7%) in the Jungle analysis area to allow for treatment of insect and disease problems (Elk Creek/Jungle Creek). |
| Gabe Timber Sale | Emigrant Creek | 1991 | Allowed the total big game winter range cover in the Gabe Timber Sale area to be reduced from the existing 18% to 17%, which is below the standard of 20% in the Gabe subwatershed. |
| Slip and Slide Timber Sale | Blue Mountain, Middle Fork John Day | 1992 | Allowed big-game cover and habitat effectiveness index on the Slip and Slide Timber Sales to drop below standards (Slide Creek subwatershed). |
| Leek Timber Sale | Blue Mountain, Middle Fork John Day | 1992 | Allowed big-game cover levels and habitat effectiveness index on the Leek Timber Sale to be below standards to achieve long-term desired future conditions |

| Project | District and summer range | Decision date | Amendment rationale |
|---|---|---|---|
| | | | (Elk/Mosquito/Deep Creek subwatershed). |
| Driveway Timber Sale | Emigrant Creek | 1993 | Allowed cover on the Driveway Timber Sale to remain below big-game winter range maintenance standards in the Muddy Creek subwatershed. |
| Cow Cabin Timber Sale | Emigrant Creek | 1994 | Allowed big game cover to be below big tame winter range maintenance requirements for the portion of the Cow Creek subwatershed within the sale area. Cover would be reduced to 23% and the standard is 25%. |
| Prater Planning Area | Emigrant Creek | 1995 | Allowed to be below winter range cover standards in both Prater/Coffeepot Creek and Rattlesnake subwatersheds. |
| Reek Timber Sale | Blue Mountain, Middle Fork John Day | 1996 | Allowed activities within cover stands in big game winter range, where the subwatershed does not meet the Forest Plan standard for minimum elk winter range (Elk Creek, Deep Creek, and Hawkins Creek subwatershed). |
| Badger Timber Sale | Emigrant Creek | 1997 | Reduced cover for winter range in the West Fork Hay Creek and Deadwood Creek subwatersheds. |

**Table 138. Forest plan amendments affecting big game winter range from 2000 to 2015**

| Project | District and summer range | Decision date | Amendment rationale | Scale of amendment |
|---|---|---|---|---|
| Silvies Canyon | Emigrant Creek, Silvies | 8/4/2003 | The areas selected for commercial thinning treatments are areas where high tree densities are increasing their risk to stand replacement fire events and insect outbreak.<br>The canopy cover that will develop is expected to be more sustainable because it will be provided by fewer, but larger and healthier trees that are more adapted to site conditions than those there presently. | Satisfactory cover and total cover in winter range will be below standards in Boulder/Fawn and Sage Hen Creek subwatersheds. The habitat effectiveness will be below standards in Myrtle and Standcliff Creek subwatersheds. |
| Canyon Creek WUI Fuels Reduction Project | Blue Mountain, Upper John Day | 12/21/2006 | The proposed mapping refines the original mapping in the Malheur Forest Plan to tie winter and summer range to logical boundaries. The MA-4a additions better reflect how big game species use this area; i.e., lower elevations along Canyon Creek are primarily being used as winter range rather than summer range.<br>Cover is reduced to meet the purpose and need of reducing fire risk in the Canyon Creek Wildland Urban Interface. Hiding/security cover patches will be maintained in all | The Big Game Winter Range (MA-4a) boundaries were adjusted, expanding them down to the National Forest boundary on either side of Canyon Creek. Boundary adjustments will increase MA-4a designation on approximately 875 acres.<br>The proposed action reduced satisfactory cover below forest plan standards in the Vance Creek, East Fork Canyon Creek and Upper Canyon Creek subwatersheds. In Vance Creek and Upper Canyon |

| Project | District and summer range | Decision date | Amendment rationale | Scale of amendment |
|---|---|---|---|---|
| | | | proposed units to mitigate effects. Five (5) to15% of each unit will be retained in untreated patches ranging in size from 2 to 5 acres.<br>Most of the treatments will occur in dry forest types. These stands are considered outside the historic range of variation (HRV), i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Most of these stands would likely fall out of cover within the next 25 years if not treated. | Creek winter range, total cover is reduced below the 25% standard. Not all cover will be treated; at least 19% of each subwatershed will be retained as satisfactory/marginal cover. |
| Balance Thinning and Fuels Reduction Project | Blue Mountain, Middle Fork John Day | 2008 | The reduction in the amount of satisfactory and total cover is necessary to meet the purpose and need of reducing the fire hazard adjacent to County Road 20. The proposal as described will treat 64 acres of satisfactory cover and 591 acres of marginal cover. Hiding/security cover patches will be maintained in proposed units to mitigate effects. Five percent of each unit will be retained in untreated patches ranging in size from 2 to 5 acres. Big game travel corridors were identified during collaboration and where located in treatment units, will be left untreated.<br>The treatments will occur in dry forest types. These stands are considered outside the historical range of variability (HRV), i.e., overstocked and likely unsustainable given the high risk of uncharacteristically severe fire and insect epidemics. Most of these stands would likely fall out of cover within the next 25 years if not treated. | Satisfactory cover is currently below forest plan standards in the Balance Creek/Coyote Creek subwatershed. The subwatershed has approximately 675 acres of satisfactory cover within Management Area 4A – Big Game Winter Range. That is equivalent to 5% of the big game winter range in a satisfactory cover condition. Forest plan standards require that 10% be in a satisfactory cover condition. Implementation of the proposed activities would further reduce the percent of satisfactory cover by less than 1% to a total of 4.8% (611 acres) of the subwatershed.<br>Total cover is currently above forest plan standards in the Balance Creek/Coyote Creek subwatershed. The subwatershed has approximately 3,625 acres of total cover within Management Area 4A – Big Game Winter Range. That is equivalent to 28% of the big game winter range. Forest plan standards require total cover to be 25% in big game winter range. Implementation of the proposed activities will |

| Project | District and summer range | Decision date | Amendment rationale | Scale of amendment |
|---|---|---|---|---|
| | | | | reduce the percent of total cover below forest plan standards. Total cover will be reduced by 5% to a total of 23% (2,970 acres) of the subwatershed. |
| Dads | Blue Mountain/Prairie City, Upper John Day | 2008 | The reduction in the amount of satisfactory and total cover is necessary to reduce the risk of loss of old growth trees due to wildfire, while maintain the habitat requirements of old growth dependent wildlife species.<br>The proposal as described will treat 8 acres of satisfactory cover to below standards in dedicated old growth. | Satisfactory cover for winter range in the Dad's Creek subwatershed is currently 6.27% which is below the forest plan standard of 10%. Satisfactory cover would be reduced to 6.26%. |
| Galena | Blue Mountain, Middle Fork John Day | 9/10/2013 | To meet the purpose and need of restoring forested lands within the project area to more closely resemble the historical range of variability of species composition, density, and stand structure, especially within the Warm Dry and Hot Dry biophysical environments; and to reduce surface fuel loads, ladder fuels and crown density resulting in reducing the potential for large, stand replacing crown fires. | Satisfactory cover for winter range in the Little Boulder/Deerhorn subwatershed is currently 5%, which is below the forest plan standard of 10% and would be further reduced to 4.9%. |

The Malheur National Forest has approximately 330,400 acres of big game winter range. Approximately 3.7 percent (approximately 12,084 acres) of the winter range on the Malheur National Forest is contained in the Magone project planning area. Alternative 2 would reduce satisfactory cover to 5.9 percent from 29.5 percent in the Grub Creek subwatershed, compared to the Malheur Forest Plan standard of 10 percent. Alternative 3 would reduce satisfactory cover to 3.3 percent from 29.5 percent in the Grub Creek subwatershed, compared to the Malheur Forest Plan standard of 10 percent, and total cover to 17.1 percent from 87.4 percent in the Grub Creek subwatershed , compared to the Malheur Forest Plan standard of 25 percent. The Magone Project would be the 15th forest plan amendment that authorizes a reduction of winter range cover below Forest Plan standards in the 25 years since the Malheur Forest Plan was approved.

The Malheur Forest Plan Record of Decision (USDA Forest Service 1990c, page 13) authorized different cover standards for seven winter range watersheds. The Magone Project would be the 3rd project to authorize a summer range amendment in the Upper John Day winter range.

The Camp Lick, Dove, Flat, and Summit projects on the Malheur National Forest are currently in the planning stages and some of these projects could include a cover amendment in big game winter range; more information will be available on if a cover amendment is going to be proposed under these projects when the Magone Final Environmental Impact Statement is released.

**Nipple Butte Wildlife Emphasis Area**

The 5,795 acre Nipple Butte Wildlife Emphasis Area (WEA; Management Area 21) is located entirely within the East Fork Beech Creek subwatershed, and nearly entirely in winter range. The Nipple Butte WEA is also included in the data for East Fork Beech Creek winter and summer range. All values meet or exceed Malheur Forest Plan standards. See Wildlife section for more information.

***Direct and indirect effects of alternative 1 (no action)*** – With no activities proposed, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards in the short-term. With no thinning or prescribed fire, increased tree stocking could increase the frequency and intensity of high-severity wildfire events. A fire of moderate to intense magnitude and severity could convert late and old structure or multi-strata cover habitat to stand initiation forage habitat in the short- and mid-term, therefore changing forage:cover ratios and distribution across the project planning area. However, with proportionate changes in ratios, HEI values would not be expected to fall below Malheur Forest Plan standards.

***Direct and indirect effects of alternatives 2 (proposed action) and 3*** – Following treatment marginal cover would continue to exceed Malheur Forest Plan standards, and satisfactory and total cover would fall below. Satisfactory cover would be 16.5 percent (under alternative 2) and 16.6 percent (under alternative 3) compared to the Malheur Forest Plan standard of 20 percent. Total cover would be 39.5 percent (under alternative 2) and 39.3 percent (under alternative 3) compared to the Malheur Forest Plan standard of 40 percent, which is less than 1 percent below the standard for both alternatives. This is likely due to the proposed extensive upland shrub enhancement treatments that would remove juniper and other conifer cover but still provide cover from mahogany and substantially increase forage.

Following the completion of implementation of vegetation treatments proposed under alternatives 2 and 3 (mid- to long-term), it would be expected that overall habitat for elk would substantially improve from current conditions. Mechanical treatments combined with prescribed fire would open the forest canopy, promote regeneration, promote vigor and expansion of grass and many browse species. Most lost vertical cover would be recovered quickly and both forage and cover quality and quantity would be expected to increase substantially. Satisfactory cover would be expected to meet or exceed Malheur Forest Plan standards in the Nipple Butte WEA in the short- to mid-term as marginal cover moved to satisfactory and additional cover through regeneration and increased vigor would be added.

The upland shrub enhancement (conifer removal) treatments proposed under alternatives 2 and 3 would be expected to improve big game habitat vastly on 3,865 acres in the Nipple Butte IRA, the majority of which would occur in the Nipple Butte WEA.

***Direct and indirect effects of alternative 4*** – Following treatment, satisfactory, marginal, and total cover would continue to exceed Malheur Forest Plan standards, although cover and size and spacing (distribution) of cover would be reduced in some areas. The lack of upland shrub enhancement (conifer removal) treatments in the WEA is noticeable under alternative 4 as HEI values actually decrease. See Wildlife section for more information.

***Cumulative effects*** – Since the Malheur Forest Plan was authorized 25 years ago, there have been no amendments to reduce cover in Management Area 21, including in the Nipple Butte WEA. The Camp Lick, Dove, Flat, and Summit projects on the Malheur National Forest are currently in the planning stages; however none of these planning areas includes Management Area 21 and thus a cover amendment in a wildlife emphasis area is not a reasonably foreseeable future action in these areas. Thus, no cumulative effects are expected from this proposed forest plan amendment.

## 3.19 Short-Term Uses and Long-Term Productivity

The National Environmental Policy Act (NEPA) requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

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. The Magone Project would result in short-term impacts, but maintain the long-term productivity of the area through the use of specific Malheur Forest Plan standards and guidelines, design measures built into the project's design, and project design criteria. A description of impacts expected by alternative can be found by resource area 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 wood products produced and jobs created.

## 3.20 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.

## 3.21 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 a power line right-of-way or road.

The action alternatives are 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 back to a productive capacity.

# 3.22 Other Required Disclosures

The NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

## 3.22.1 Environmental Justice Act, Executive Order 12898, Consumers, Civil Rights, Minorities, or Women

Executive Order 12898 on Environmental Justice directs federal agencies to consider whether actions may have disproportionately high and adverse environmental effects on minority populations, low-income populations, or Indian Tribes. The order directs federal agencies to focus attention on human health and environmental effects to minorities (American Indians, Hispanics, African Americans, and Asian and Pacific Islander Americans), disabled people, and low-income groups.

The population of the area is predominately white, followed by American Indians. The region is sparsely populated and contains low populations of minorities (4.5 percent minority population in Grant County, 4.4 percent minority population in Baker County, and 7.0 percent minority population in Harney County) (American Community Survey 2012). The primary American Indian tribes nearby are the Burns Paiute Tribe, Confederated Tribes of the Umatilla Reservation and Confederated Tribes of the Warm Springs.

Data regarding minorities or people with disabilities employed in the region in the timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration.

Nearby low income communities would mainly be affected by economic impacts connected with contractors implementing harvest, road reconstruction, tree thinning, planting, other fuels treatment activities, and aquatic restoration, providing jobs associated with project activities.

With implementation of the action alternatives, there would not be disproportionately high and adverse human health or environmental effects on minority or low-income populations. The actions would occur in a remote area and nearby communities would mainly be affected by economic impacts as related to contractors implementing harvest and thinning activities. Racial and cultural minority groups are often well represented in the work force that would implement prescribed fire, tree planting, and thinning activities. Contracts contain clauses that address worker safety.

Effects on civil rights, including those of minorities and women, would be minimal. Activities associated with the proposed action would be governed by Forest Service contracts, which are awarded to qualified purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements. While the proposed activities would create jobs and timber harvest would provide consumer goods, no quantitative output, lack of output, or timing of output associated with these projects would affect the civil rights, privileges, or status quo of consumers, minority groups, or women.

### 3.22.2 National Historic Preservation, Treaty Rights, Executive Order 12875, Executive Order 13287, American Antiquities Act of 1906, and American Indian Religious Freedom Act

Heritage and Tribal interests are regulated by Federal laws that direct and guide the Forest Service in identifying, evaluating, and protecting heritage resources. All of the alternatives would comply with federal laws. The Malheur Forest Plan tiers to these laws, therefore the action alternatives would meet forest plan standards. With the completion of the heritage inventory under the terms of the 2004 Programmatic Agreement with Oregon State Historic Preservation Office, and by providing the interdisciplinary team with appropriate input as per NEPA, all relevant laws and regulations have been met.

### 3.22.3 Ecologically Critical Areas

There are no ecologically critical areas in the project planning area.

### 3.22.4 Prime Farmlands, Rangelands, and Forest Lands

Prime Farmlands: The project planning area is not located in or adjacent to prime farmlands; therefore, there would be no impact to Prime Farmlands.

Prime Rangelands: The project does not contain prime rangelands because of soils, climate, and none of the proposed activities in the project planning area would convert rangelands to other uses. Therefore, there would be no negative impacts on Prime Rangelands.

Prime Forestland: The project would not convert forestlands to other uses. All lands designated as forested would be retained and managed as forested; therefore, there would be no negative impacts on Prime Forestlands.

### 3.22.5 Clean Water Act, Floodplains, and Wetlands

#### 3.22.5.1 Clean Water Act

The Federal Water Pollution Control Act of 1972 (Public Law 92-500, also known as the Clean Water Act) and ensuing regulations form the foundation for environmental analysis for the watershed and hydrology resource. The main objective of the Clean Water Act is to “restore and maintain the chemical, physical, and biological integrity of the Nation's waters” (CWA Section 101 (a)). The Forest Service is directed to “Comply with State requirements in accordance with the Clean Water Act for protection of waters in the State of Oregon (see Oregon Administrative Rules, Chapter 34041) through planning, application and monitoring of best management practices (BMPs) in conformance with Clean Water Act, regulations, and Federal guidance issued thereto” (USDA Forest Service 1990a, Standard 117, page IV-39).

The Malheur Forest Plan provides direction to protect and manage water resources through compliance with State requirements described in a May 2002 Memorandum of Understanding (MOU) that are in accordance of the Clean Water Act. The MOU states that the Forest Service cannot further degrade water quality impaired streams through management activities. The MOU recognizes that BMPs are the primary means to control non-point source pollution on National Forest lands. Adherence to BMPs provides adequate protection and avoids significant effects to listed impaired streams within the project area or its influence.

#### 3.22.5.2 Floodplains (Executive Order 11988)

Executive Order 11988 says that Federal agencies shall avoid adverse effects to floodplains or minimize potential harm. Floodplains several to hundreds of feet wide occur in the project planning area. The floodplains are primarily contained within riparian habitat conservation areas. Implementation activities proposed would improve the physical processes of floodplain connectivity and floodplain functions of water storage through being inundated. The action alternatives would minimize adverse effects to the floodplains, and thus be consistent with Executive Order 11988.

#### 3.22.5.3 Wetlands (Executive Order 11990)

Executive Order 11990 says that Federal agencies shall avoid management practices that would adversely affect wetlands. Wetlands that occur in the project planning area would be maintained, improved, or expanded in spatial extent with improved function. Focusing on riparian vegetation and channel condition, it would allow increased water storage in the floodplains and is consistent with the Executive Order protecting Wetlands.

#### 3.22.5.4 Potential and Unusual Expenditures of Energy

There are no potential or unusual expenditures of energy expected with this project.

#### 3.22.5.5 Conflicts with Plans, Policies, or Other Jurisdictions

There are no known conflicts with plans or policies of other jurisdictions associated with the alternatives.

### 3.22.6 Migratory Bird Treaty Act

The alternatives are consistent with the 1918 Migratory Bird Treaty Act and the Migratory Bird Executive Order 13186. The action alternatives were designed under current Forest Service policy for landbirds. The *Conservation Strategy for Landbirds in the Northern Rocky Mountains of Eastern Oregon and Washington* (Altman 2000) and the U.S. Fish and Wildlife Service's *Birds of Conservation Concern* (USDI FWS 2008a) were reviewed for effects disclosure. The action alternatives were designed to protect or enhance priority habitats for landbird species, including neotropical migratory species.

### 3.22.7 Clean Air Act

All action alternatives would comply with the Clean Air Act and the Oregon State Smoke Management Plan. Burning of any kind would not occur unless prior approval is granted by Oregon Department of Forestry.

### 3.22.8 Endangered Species Act

The action alternatives are consistent with the Endangered Species Act. Biological evaluations and the biological assessment have been completed for all threatened, endangered, and sensitive plants, aquatic species, and terrestrial wildlife. All biological evaluations are located in the project record for the Magone Project.

The Malheur National Forest has initiated ESA section 7 consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service on the actions proposed as part of the Magone Project, and will provide the regulatory agencies with a biological assessment regarding effects of the project to threatened Mid-Columbia River steelhead and their designated critical habitats. The completed biological assessment and consultations will be located in the Magone project record.

### 3.22.9 National Forest Management Act

Requirements of the National Forest Management Act of 1976 (P.L. 94-588), including amendments to the Forest and Range Renewable Resource Planning Act of 1974 (P.L. 93-378) would be met. Timber harvest would only occur on soils, slopes, or watershed conditions that would not be irreversibly damaged. Protection is provided for streams and streambanks from detrimental changes in water temperatures and deposits of sediment that would prevent serious and adverse effects to water conditions or fish habitat (see Aquatic Resources and Watershed sections). No regeneration harvest is proposed under any of the action alternatives. No harvest is proposed in Malheur Forest Plan management areas that are classified as “unsuitable.”

### 3.22.10 Multiple-Use Sustained Yield Act of 1960

The Multiple Use-Sustained Yield Act of 1960 authorizes and directs the Secretary of Agriculture to develop and administer the renewable resources of timber, range, water, recreation, and wildlife on the national forests for multiple use and sustained yield of the products and services. The alternatives meet the intent of the Multiple Use-Sustained Yield Act by providing timber products and service (renewable resources) from the National Forest without impairment of the productivity of the land. Proposed management of the lands in the project planning area are consistent with the goals and objectives of the Malheur Forest Plan and would continue to provide for the needs of the American people to enjoy multiple uses associated with water resources, recreation, and wildlife.

### 3.22.11 Facilitation of Hunting Heritage and Wildlife Conservation (Executive Order 13443)

The purpose of this order is to direct federal agencies that have activities that have a measurable affect to public land management to facilitate the expansion and enhancement of hunting opportunities for the public. With implementation of the action alternatives there would be no effects to hunting opportunities or seasons.

### 3.22.12 Administrative Procedures Act and Grant County Plans

This project is consistent with the Administrative Procedures Act, the Grant County Comprehensive Land Use Plan, and other county statutes.

There are no known RS2477 claims for any roads proposed for access changes in the project planning area.

### 3.22.13 Municipal Watersheds

There are no municipal watersheds affected by the project, therefore, there are no impacts.

# Chapter 4. Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and other organization and individuals during the development of this environmental impact statement:

## 4.1 Interdisciplinary Team Members

**Table 139. Interdisciplinary team members**

| Resource | Name | Educational degree | Years' experience |
|---|---|---|---|
| Silviculture | Teri Corning-Sevey | Bachelor of Science, Forest Resource Management; Associates Degree, Forest Technology | 30 years as a professional forester with experience in timber, fuels, planning, GIS, and silviculture. 6 years as a forestry technician with experience in fire, fuels, timber, and silviculture |
| Fire, Fuels, and Air Quality | Tim Boyce | Bachelor of Science, Forest Engineering | 21 years |
| Wildlife | Dustin Hollowell | Master of Science, Wildlife Management | 5 years |
| Fisheries | Daniel Armichardy | Master of Science, Biology (Emphasis on Fish Migration); Bachelor of Science, Fish and Wildlife Management | 10 years |
| Hydrology | Mary Lou Welby | Master of Science, Forestry; Bachelor of Arts, Biological Science (Botany) | 23 years |
| Soils | Robert "Hersh" McNeil | Doctor of Philosophy, Forestry; Bachelor and Master of Science, Botany | 25 years |
| Logging Systems | Krystal Cates | Associates Degree, Natural Resource Management | 11 years |
| Roads | Jonathan Gill | Bachelor of Science, Civil Engineering | 2 years |
| Inventoried Roadless Areas and Other Undeveloped Lands | Randy Kyes | Master of Science, Environmental Science | 15 years (3 years natural resources, 12 years hydrology) |
| Archeology | Robert Dickenson | Master of Arts, Anthropology; Bachelor of Art, Anthropology | 2 years |
| Range and Non-Native Invasive Plants | Nick Stiner | Bachelor of Science, Rangeland Ecology and Management, Crop Science, Soil Science, and Business | 15 years |

| Resource | Name | Educational degree | Years' experience |
|---|---|---|---|
| Botany | Paula Brooks | Bachelor of Arts, General Biology | 25 years |
| Recreation | Eric Amstad | Bachelor of Science, Forest Recreation Resources | 2 years |
| Visuals | Shannon Winegar | Bachelor of Science | 27 years |
| Interdisciplinary Team Leader, NEPA | Sasha Fertig | Master of Community and Regional Planning; Bachelor of Science, Fisheries and Wildlife Science | 5 years as a NEPA Planner. 3 years as a fisheries, hydrology, or forestry technician. |
| Writer Editor | Kathy Schnider | Master of Science, Public Communication; Bachelor of Arts, Secondary Education English | 5 years |
| GIS and Data Services | Robin Harris | | |

## 4.2 Consultation and Coordination

The Forest Service is consulting with the following individuals, Federal, State, and local agencies, and tribes during the development of this environmental impact statement:

### 4.2.1 Federal, State, and Local Agencies

- 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. Environmental Protection Agency

### 4.2.2 Tribes

- Burns Paiute Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs

## 4.3 Distribution of the Draft Environmental Impact Statement

This environmental impact statement has been distributed to individuals or organizations who specifically requested a copy of the document and those who submitted scoping comments:

- Dick Artley
- Janine Belleque (Oregon State Marine Board)
- Larry Blasing
- Kenneth and Cecelia Brooks
- Cal Christensen
- Mike and Sophie Cosgrove
- Karen Coulter (Blue Mountains Biodiversity Project)

- Elaine Eisenbrown (North Fork John Day Watershed Council)
- Bobby Grover
- Pam Hardy (Oregon Wild)
- Debi Hueckman
- Paula Hood (Blue Mountains Biodiversity Project)
- Irene Jerome (American Forest Resource Council)
- Jason and Clair Kehrberg
- Bob and Judy Kerr
- Douglas Kile
- Teresa Kubo (US Environmental Protection Agency, Region 10)
- Mark Pengelly (Grant County Access Advisory Board)
- Brooks Smith
- Doug Smith (Strawberry Striders)
- Waid Tait
- Ryan Torland (Oregon Department of Fish and Wildlife)
- Bill Wilcox

In addition, copies have been sent to the following Federal agencies and federally recognized tribes:

- Burns Paiute Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs
- U.S. Department of Agriculture, National Agricultural Library
- U.S. Environmental Protection Agency, Region 10
- U.S. Department of the Interior, Office of Environmental Policy and Compliance

Additionally, approximately 170 additional individuals or organizations were notified of the availability of the draft environmental impacts statement on the Malheur National Forest's webpage and at the Malheur National Forest Supervisor's Office / Blue Mountain Ranger District Office through letter or email.

# Glossary

**active crown fire** – Continuous crown fire that burns the entire canopy fuel complex but depends on heat from surface fuel combustion for continued spread.

**active management** – Planned, intentional actions in an area that are specifically designed to obtain a desired objective or result.

**administrative site** – Areas such as work centers, fire lookouts, permitted ranch headquarters, seed orchards, communication sites, utility corridors, developed campgrounds, and other areas that are occupied or used by the Forest Service during the administration of work associated with national forest lands.

**age class** – A group of trees that started growing (regenerated) within the same time frame, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1–20 years or 21–40 years.

**air pollutant** – Any substance in air that could harm humans, animals, vegetation, or material if in high enough concentration. Air pollutants may include almost any natural or artificial matter capable of being airborne, in the form of solid particles, liquid droplets, gases, or a combination of these.

**air quality** – The composition of air with respect to quantities of pollution therein, used most frequently in connection with standards of maximum acceptable pollutant concentrations.

**airshed** – A geographic area that, because of topography, meteorology, and climate, shares the same air.

**allotment** (grazing) – Area designated for use by a prescribed number of livestock for a prescribed time.

**anadromous fish** – Fish that hatch in fresh water, migrate to the ocean, mature there, and return to fresh water to reproduce, for example, salmon and steelhead.

**aquatic –** Pertaining to water.

**aquatic ecosystem** – Waters that serve as habitat for interrelated and interacting communities and populations of plants and animals. The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur therein.

**areas with wilderness characteristics** – Areas identified using inventory procedures found in Forest Service Handbook (FSH) 1909.12, chapter 70, section 71. The inventory is conducted by the Forest Service during forest plan revision with the purpose of identifying all lands that may have wilderness characteristics.

**aspect** – The direction a surface faces. A hillside facing east has an eastern aspect.

**basal area** – The area of the cross-section of a tree trunk near its base, usually 4 1/2 feet above the ground. Basal area is a way to measure how much of a site is occupied by trees. The term basal area is often used to describe the collective basal area of trees per acre.

**basalt** – A finely or fine grained, dark, dense volcanic rock.

**basin (river)** – (1) In general, the area of land that drains water, sediment, and dissolved materials to a common point along a stream channel. River basins are composed of large river systems; (2) the term refers to the equivalent of a 3rd-field hydrologic unit code, an area of about nine million acres, such as the John Day River Basin.

**best management practices (BMPs)** – Practice or set of practices that enable a planned activity to occur while still protecting the resource managed, normally implemented and applied during the activity rather than after the activity.

**Best Management Practices (Watershed)** – A practice or a combination of practices determined by the state (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing, or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

**big game** – Those species of large mammals normally managed as a sport hunting resource. Generally includes: elk, moose, white-tailed deer, mule deer, mountain goat, bighorn sheep, black bear and mountain lion.

**big game summer range** – A range usually at higher elevations, used by deer and elk during the summer. Summer ranges are usually much more extensive than winter ranges.

**big game winter range** – A range usually at lower elevation used by migratory deer and elk during the winter months; usually more clearly defined and smaller than summer range.

**biophysical** – The combination or grouping of biological and physical components in an ecosystem.

**biophysical environments** – Plant association group (PAG) - Vegetation classification using similar moisture and temperature environments resulting in similar fire regimes.

**biomass** – Biological material derived from living, or recently living organisms. In the context of biomass as a resource for making energy, biomass can be defined as pieces that are generally not large enough to have commercial sawlog value, but meet the minimum requirement of 12 feet long to a 3-inch top. This material may be used for pulp chips, co-generation of electricity, commercial fuel pellets, post and poles, small sawlogs, and other non-traditional uses.

**browse** – Twigs, leaves, and young shoots of trees and shrubs that animals eat (such as deer and elk).

**buffer** – A land area designated to block or absorb impacts to the area beyond the buffer. For example, a streamside buffer is often retained to reduce impacts of a harvest unit.

**candidate species** – Plant and animal species that may be proposed for listing as endangered or threatened in the future by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NFMS); these species have no legal protection under the Endangered Species Act (ESA).

**canopy** – In a forest, the branches of the uppermost layer of foliage. It can also be used to describe lower layers in a multistoried forest.

**canopy cover** – The proportion of the forest floor covered by the vertical projection of the tree crowns.

**canopy base height –** The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy.

**canopy closure** – The amount of ground surface shaded by tree canopies as seen from above. Used to describe how open or dense a stand of trees is, often expressed in 10 percent increments.

**canopy fuels** – the part of the canopy that can burn in the flaming front of a crown fire. The foliage and some branch wood, which is less than 0.25 inches (0.6 centimeters) in size, are usually considered available canopy fuel. Larger fuel pieces in the canopy do not burn quickly enough to contribute to crown fire spread and are not considered canopy fuels.

**carrying capacity** – The number of animals or plants that can be maintained over a specific period on a specified amount of land without damage to either the organisms or the habitat.

**cavity** – A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

**channel (stream)** – The deepest part of a stream or riverbed through which the main current of water flows.

**channel morphology** – The dimension (width and depth), shape and pattern (sinuous, meandering, or straight) of a stream channel.

**class 1 airshed** – Under the Clean Air Act amendments, this class applies to all international parks, national parks larger than 6,000 acres, and national wilderness areas larger than 5,000 acres that existed on August 7, 1977. This class provides the most protection to pristine lands by severely limiting the amount of additional air pollution that can be added to these areas.

**climax** – The final or mature seral stage in secondary plant succession that persists for an indefinite period if no major disturbances occur.

**closed canopy** – Greater than or equal to 60 percent canopy cover within the moist and cold upland forest potential vegetation groups; greater than or equal to 40 percent canopy cover within the dry upland forest potential vegetation group.

**coarse woody debris or material** – Pieces of woody material derived from tree limbs, boles, and roots in various stages of decay, having a diameter of at least three inches.

**Code of Federal Regulations (CFR)** – A codification of the general and permanent rules published in the Federal Register (FR) by the executive departments and agencies of the federal government.

**commercial thinning** – Any type of thinning producing merchantable material at least equal to the value of the direct costs of harvesting (Helms 1998).

**conifer** – A tree that produces cones, such as a pine, spruce, or fir tree.

**connectivity** – The arrangement of habitats that allow organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. Connectivity is the opposite of fragmentation.

**consultation** – The term refers to a requirement under Section 7 of the Endangered Species Act for federal agencies to consult with the U.S. Fish and Wildlife Service and National Marine Fisheries with regard to federal actions that may affect listed threatened and endangered species or critical habitat.

**corridor** – A tract of land forming a passageway. Can refer to areas of wildlife movement, boundaries along rivers, or the present or future location of a transportation or utility right-of-way within its boundaries.

**Council on Environmental Quality (CEQ)** – An advisory council to the President established by the National Environmental Policy Act (NEPA) of 1969. The council reviews federal programs for their effects on the environment, conducts environmental studies, and advises the President on environmental matters.

**cover –** (1) Any feature that conceals wildlife or fish, sometimes referred to as "hiding cover." Cover may be dead or live vegetation, boulders, or undercut stream banks. Animals use cover for protection from predators, or to ameliorate conditions of weather, or in which to reproduce; (2) the area of ground covered by plants of one or more species.

**critical habitat** – Areas designated for the survival and recovery of federally listed threatened or endangered species.

**crown** – The part of a tree containing live foliage; treetops.

**crown fire –** A forest fire that advances through the crown fuel layer normally in direct conjunction with a surface fire.

**cubic feet per second (cfs)** – A rate of flow, in streams and rivers, for example. It is equal to a volume of water one foot deep and one foot wide flowing a distance of one foot in one second. One cfs is equal to 7.48 gallons of water flowing each second.

**cultural resource** – An object or definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, places, or objects and traditional cultural properties. Cultural resources include the entire spectrum of resources for which the Heritage Program is responsible, from artifacts to cultural landscapes, without regard to eligibility for listing on the National Register of Historic Places.

**cumulative effects or impacts** – Cumulative effects or impacts are the impacts on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time. Effects and impact are synonymous (40 CFR 1508.7).

**danger tree** – A hazard tree is considered any tree that is likely to fail within one and one-half tree lengths of an open class 3 or higher system road, any road designated for hauling, developed recreation, or administrative site.

**decommission (road)** – Activity that results in the stabilization and restoration of unneeded roads to a more natural state. Decommissioning removes the road segment from the Forest road inventory and it is no longer used to calculate maintenance costs for the transportation system. Decommissioning can include activities such as closing entrances to roads; scarifying road surfaces or decompacting (sub-soiling) to establish vegetation and reduce run-off; seeding road to control erosion; partial to full restoration of stream channel by removing culverts and fills; and removing unstable portions of embankments.

**density (stand)** – The number of trees growing in a given area, usually expressed in terms of trees per acre.

**departure** – The difference between an existing condition and the desired condition.

**design criteria –** Provides the parameters, including guidelines, for how future site-specific activities can occur within the context of the plan.

**designated critical habitat** – Specific areas within the geographical area occupied by a species at the time of listing under Endangered Species Act that contain physical or biological features essential to the conservation of the species.

**desired future condition** – A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

**developed recreation –** Recreation that requires facilities that in turn result in concentrated use of an area, for example, a campground. Examples of developed recreation areas are campgrounds and ski areas; facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

**diameter at breast height (DBH)** – Tree diameter measured at 4.5 feet from the ground.

**direct effects** – Impacts on the environment caused by the action, which occur at the same time and place.

**disease** – A harmful deviation from normal functioning of physiological processes, usually pathogenic or abiotic in origin.

**disjunct** – Populations that are separated geographically from the main distribution of a species. Many plants with disjunct populations are biologically unique because they are not found again for dozens to over one hundred miles. Disjunct populations are thus rare in this portion of their distribution.

**dispersed (recreation)** – Recreation that does not occur in a developed recreation site, for example, hunting or backpacking.

**dispersed campsites –** Primitive sites typically used for overnight, dispersed recreation. Usually includes a hardened area around a fire pit, a barren area, and/or user-constructed facility.

**disturbance** – Events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and diseases. Human–caused disturbances include, among others, actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

d**iversity** – The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

**dedicated old growth (DOG)** – Forested areas managed for old-growth characteristics for old-growth dependent species.

**duff –** Organic matter in various stages of decomposition on the floor of the forest.

**early seral species** – Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process

**Eastside Screens** – Regional Foresters' Forest Plan Amendment establishes riparian, ecosystem, and wildlife standards for timber sales on National Forest System lands in eastern Oregon and Washington (USDA Forest Service 1994).

**ecosystem function (processes)** – The flow and cycling of energy, materials, and organisms in an ecosystem. Examples of ecosystem processes include the carbon and hydrologic cycles, terrestrial and aquatic food webs, and plant succession, among others.

**ecosystem** – A complete interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

**endangered species** – A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

**ephemeral** – A channel in which streamflow occurs inconsistently, infrequently, or seasonally and, except during periods of streamflow, does not intersect the local groundwater table (e.g., streams that flow only as the direct result of rainfall or snowmelt).

**erosion** – The wearing away of the land surface by wind, water, ice, gravity, or other geological activities. Erosion can be intensified by human activities (such as road building) that may reduce the stability of soils or slopes.

**extirpation** – Loss of populations from all or part of a species' range within a specified area.

**federally listed species –** Species that are listed under the Endangered Species Act.

**fine fuels** – Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than ¼ -inch in diameter and have a time lag of one hour or less. When dry, these fuels readily ignite and are rapidly consumed by fire.

**fire behavior** – How fire reacts to the influences of fuel, weather, and topography.

**fire-dependent –** Forests, grasslands, and other ecosystems historically composed of species that evolved with and are maintained by periodic fire.

**fire hazard** – the potential magnitude of fire behavior and effects as a function of fuel conditions for any particular forest stand or landscape.

**fire-intolerant** – Species of plants that do not grow well or die from the effects of too much fire. Generally, these are shade-tolerant species.

**fire-tolerant** – Species of plants that can withstand certain frequency and intensity of fire. Generally, these are shade-intolerant species.

**fire regime** – A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention, but including the influence of aboriginal burning (Agee 1993). Coarse scale definitions for natural (historical) fire regimes have been developed and interpreted for fire and fuels management. The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity of the fire (the amount of vegetation replacement) and its effect on the dominant overstory vegetation. These five natural fire regimes are defined in the fuels Fire, Fuels, and Air Quality section of the EIS.

**fire-return interval** – The average number of years between successive fires in a designated area.

**fire risk** – the chance of a fire starting from any ignition source, determined by using the frequency of past fire starts.

**fire severity or burn severity** – Severity describes the aboveground and belowground organic matter consumption from fire. Aboveground measures include tree crown canopy scorch, crown volume kill, and bole height scorch. Belowground and soil measures include ash deposition, surface organic matter, belowground organic matter contributing to soil structures, and heat-induced oxidation of minerals. Fire severity ratings (low, moderate, and high) are based on standards in Forest Service Handbook 2509.13.

**fire suppression** – All work and activities connected with fire-extinguishing operation, beginning with discovery and continuing until the fire is completely extinguished.

**floodplain** – The lowland and relatively flat areas joining inland and coastal waters including debris cones and flood-prone areas of off-shore islands, including at a minimum, that area subject to a one percent (100-year recurrence) or greater chance of flooding in any given year (Executive Order 11988, Section 6c); or the area of relatively flat land adjacent to streams that is inundated during times of high flow; or an area formed by the deposition of stream-transported sediment.

**floodplain function** – Collectively, the normal physical and biological processes that are responsible for the formation and maintenance of river floodplains and the biotic communities that inhabit them.

**flow regime** – The range of magnitude, duration, timing and frequency of streamflows characteristic of a given stream.

**forb** – Broad-leafed, herbaceous, nongrass-like plant species other than true grasses, sedges, and non-woody plants; fleshy leafed plants; having little or no woody material.

**forage** – Vegetation (both woody and non-woody) eaten by animals, especially big game and livestock.

**foreground** – The part of a scene or landscape that is nearest the viewer.

**forest health** – The condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity while providing for human needs and values. It is a useful way to communicate about the current condition of the forest, especially with regard to resiliency, a part of forest health that describes the ability of the ecosystem to respond to disturbances. Forest health and resiliency can be described, in part, by species composition, density, and structure.

**fragmentation** – The breakup of a large land area (such as a forest) into smaller patches that are isolated from the original area. Fragmentation can occur naturally (as by stand-replacing wildfire) or from human activities (such as road building).

**fuel ladder** – Shrubs, small trees, and low growing branches that allow fire to move from the ground to the tree crowns.

**fuel(s) –** Combustible material that includes vegetation such as grass, leaves, ground litter, plants, shrubs, and trees. Includes both living plants; dead, woody vegetative materials; and other vegetative materials which are capable of burning.

**ground fire** – A fire that burns along the forest floor and does not affect trees with thick bark or high crowns.

**ground fuels** – All combustible materials below the surface litter layer. These fuels may be partially decomposed, such as forest soil organic layers (duff), dead moss and lichen layers, punky wood and deep organic layers (peat), or may be living plant material, such as tree and shrub roots.

**habitat –** The place where a plant or animal finds what it needs to survive, either year-round or seasonally.

**harvest –** (1) Felling and removal of trees from the forest; (2) removal of game animals or fish from a population, typically by hunting or fishing.

**hiding cover** – Vegetation capable of hiding 90 percent of an adult elk from a human's view at a distance of 200 feet or less.

**historical range of variability (HRV)** – A characterization of the natural fluctuation of components of healthy ecosystems through time. In this EIS, it refers to the range of conditions and processes that are likely to have occurred prior to settlement of the planning area by people of European descent (approximately the mid-1800s), which would have varied within certain limits over time.

**intensity (fire intensity)** – The rate of heat/energy release for an entire fire at a specific time.

**intermittent stream** – A stream that flows only at certain times of the year when it receives water from streams or some surface source, such as melting snow.

**inventoried roadless area (IRA)** – Areas identified in a set of inventoried roadless area maps, contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2, dated November 2000, and any subsequent update or revision of those maps through the land management planning process

**irretrievable –** A category of impacts that applies to losses of production or commitment of renewable natural resources.

**irreversible –** A category of impacts that applies to non-renewable resources, such as minerals. Losses of these resources cannot be reversed. Irreversible effects can also refer to effects of actions on resources that can be renewed only after a very long period, such as the loss of soil productivity.

**issue** – A matter of controversy, dispute, or general concern over resource management activities or land uses. To be considered a "significant" EIS issue, it must be well defined, relevant to the proposed action, and within the ability of the agency to address through alternative management strategies.

**ladder fuels** – Fuels that provide vertical continuity between strata. Fire is able to carry from the surface fuels by convection into the crowns with relative ease.

**landing zone** – Any place where cut timber is collected before further transport from the timber sale area.

**late seral species** – Late or old seral refers to plant present during a later stage of plan community succession (mature and old-growth forest).

**late and old structure** – Old forest where large trees are frequent.

**maintenance burning** – maintenance burns are designed to reduce fuel on the surface: grass, pine needles, and dead and down wood to reduce the potential for rapid fire spread. Usually follows 2-3 years after an initial prescribe burn reduces the fuel loading to the desired levels to allow for low intensity frequent fires.

**mechanical treatments** – Vegetation changes done by mechanical cutting methods instead of by other means, such as prescribed burning.

**merchantable timber** – Timber that can be bought or sold.

**middleground** – A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer.

**management indicator species (MIS)** – A wildlife species selected by a land management agency to indicate the health of the ecosystem in which it lives and, consequently, the effects of forest management activities on that ecosystem.

**mitigation –** Measures designed to counteract environmental impacts or make impacts less severe.

**monitoring** – A process of collecting information to evaluate whether or not objectives of a project and its mitigation activities are being realized.

**mortality** – The loss of a population due to all lethal causes, often referring to the rate of death of a species in a given population or community.

**mosaic** – A pattern of vegetation in which two or more kinds of plant communities are interspersed in patches, such as a meadow between stands of old growth.

**multiple-use management –** The management of public lands and their various resource values so they are used in the combination that best meets the present and future needs of the American people.

**non-commercial thinning** – Thinning in tree stands where the trees cut are generally not merchantable sawlog size material. The objective is to reduce ladder fuels, reduce the amount of live and dead fuels, and increase tree growth.

**noxious weed** – A weed that causes disease or has other adverse effects on man or his environment and, therefore, is detrimental to public health and the agriculture and commerce of the United States. Noxious weeds are often aggressive and difficult to manage and non-native, new, or not common to the United States.

**old growth** – Old forests often containing several canopy layers, variety in tree sizes and species, decadent old trees, and standing and dead woody material.

**open road density** – Miles of open road per square mile

**overstory** – The upper canopy layer; the plants below comprise the understory.

**PACFISH** – Interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California.

**passive crown fire** – Fire that kills individual trees or small groups of trees (torching).

**perennial stream** – A stream that flows throughout the year from its source to mouth.

**pile burning** – Cut material piled either by hand or mechanical – resulting from logging or fuel management activities – are burned during the wetter months to reduce damage to residual stand and to confine fire to the size of the pile. Piling allows material to cure, producing less smoke and rapid consumption when burned.

**plant association groups (PAGS)** – Plant associations for the Blue Mountains were grouped into plant association groups by Powell et al. (2007) based on a temperature and moisture gradient and represent similar ecological environments. Plant association groups are used to differentiate between different forest types. Plant association groups within the Magone project planning area include:

> ***Hot Dry forest*** – Occupies low to mid elevations and mainly south slopes. Stands are composed primarily of ponderosa pine. Fire regime is low intensity, high frequency 10 to 15 years) over most of the area, with small patches of mortality.

***Warm Dry forest*** – Occupies low to mid elevations and south slopes at higher elevations. Stands are composed of ponderosa pine, Douglas-fir, lodgepole pine, grand fir, and western larch. Fire regime is low intensity, high frequency (10 to15 years) over most of the area, with small patches of mortality.

***Warm Moist forest*** – Similar to Warm Dry, but located in areas of more moisture with more shrubs such as ninebark, maples, and oceanspray in the understory. Fire regime is low intensity, high frequency (10 to 15 years) over most of the area, with small patches of mortality.

***Warm Very Moist forest*** – Occupies low to mid elevations in draw bottoms and toeslopes. Stands are composed of grand fir, western larch, Douglas-fir, and Engelmann spruce, with an understory of Rocky Mountain maple, big huckleberry, and other moist shrub and forb species. Fire regime is relatively frequent (2 to 120 years) mixed severity. Stand replacement patch size would range from 1 to 100 acres.

***Cool Moist forest*** – Occupies mid elevations, northerly aspects and cooler, wetter draw bottoms. Stands are composed of ponderosa pine, Douglas-fir, grand fir, lodgepole pine, western white pine, and western larch. Fire regime is relatively frequent (2 to 120 years) mixed severity. Stand replacement patch size would range from 1 to 100 acres.

***Cool Wet forest*** – Similar to Cool Moist, but slightly more moist with a component of Pacific yew. Fire regime is relatively frequent (2 to 120 years) mixed severity. Stand replacement patch size would range from 1 to 100 acres.

***Cool Dry forest*** – Occupies northerly aspects, colder, relatively dry areas such as frost pockets, and areas of granitic parent material. Stands are composed of primarily Engelmann spruce, western larch, and lodgepole pine. Fire regime is relatively frequent (2 to 120 years), mixed severity with evidence of susceptibility to torching and crown fires in lodgepole pockets.

***Cold Dry forest*** – Occupies high elevation sites, northerly aspects, and colder, relatively dry areas such as frost pockets. Stands are composed of Engelmann spruce, western larch, and lodgepole pine. The fire regime is high intensity, low frequency (50 to 275+ years) with noticeable susceptibility to torching and crown fires.

***juniper woodlands*** – Occupies dry sites at low to mid elevations, often on south slopes and scab environments at high elevations. Stands were historically open ponderosa pine savannahs and sparse western juniper that was maintained by frequent fires.

**prescribed fire –** The intentional use of fire under specified conditions to achieve specific management objectives.

**prescription –** Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations.

**rangeland (range)** – Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

**redd** –Spawning nest made by salmon or steelhead in the gravel bed of a river.

**reforestation –** The restocking of an area with forest trees by either natural or artificial means such as planting.

**resident fish** – Fish that spend their entire life in freshwater: examples include bull trout and westslope cutthroat trout.

**resiliency –** The capacity of a plant community or ecosystem to maintain or regain normal function and development following disturbance.

**revegetation –** Establishing or reestablishing desirable plants on a site where they are absent or in few numbers. Revegetation can be accomplished through natural or artificial reseeding or transplanting.

**riparian area** – The interface between aquatic and terrestrial ecosystems that is identified by the presence of vegetation that requires or tolerates free or unbound water or conditions that are more moist than normal.

**riparian habitat conservation area (RHCA)** – Portions of watersheds where riparian-dependent resources receive primary emphasis and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris and nutrient delivery systems. RHCAs are further defined into four categories:

> ***Category 1*** – Fish-bearing streams: consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.
>
> ***Category 2*** – Permanently flowing non-fish-bearing streams: consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.
>
> ***Category 3*** – Ponds, lakes, reservoirs, and wetlands greater than 1 acre: consist of the body of water or wetland and the area to the outer edge of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.
>
> ***Category 4*** – Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslide-prone areas: This category includes features with high variability in size and site-specific characteristics.

**road** – A motor vehicle route over 50 inches wide, unless identified and managed as a trail.

**road decommissioning** – Road decommissioning would eliminate future use of the road with the objective of restoring hydrological function. This can include subsoiling and seeding as necessary.

**road maintenance** – Road maintenance activities include blading and shaping road surfaces, repairing a damaged ditch-relief culvert, rocking existing drain dips and grade sags where needed, rocking wet areas of road, brushing, removal of danger trees, and dust abatement.

**replacement old-growth (ROG)** – Forested area chosen to provide future old-growth habitat if current designated stands no longer meet old-growth characteristics.

**scoping** – The early stages of preparation of an environmental analysis to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations, or letters.

**sensitive species** – A sensitive species is one that has been designated by the Regional Forester because of concern for population viability. Indications for concern include significant current or predicted downward trends in population numbers or density or in habitat capability that would reduce an existing species distribution.

**seral** – Refers to the sequence of transitional plant communities during succession. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid-seral in a forest would refer to pole or medium saw timber growth stages; late or old seral refers to plants present during a later stage of plant community succession (such as mature or old forest stages).

**shade-intolerant species –** Species of plants that do not grow well in the shade of others. They are species that develop on a site soon after a major disturbance. Ponderosa pine and western larch are shade-intolerant tree species.

**shade-tolerant species –** Species of plants that grow well in the shade of others. Douglas-fir is a relatively shade-tolerant tree.

**silviculture** – The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplish specific objectives.

**skyline** – A cableway stretched tautly between two spars and used as a track for log carriers

**slash** – The residue left on the ground after timber cutting or after a storm, fire, or other event. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, bark, etc.

**snag** – A standing dead tree.

**soil compaction** – The reduction of soil volume. For instance, the weight of heavy equipment on soils can compact the soil, making it hard and dense, and thereby changing it in some ways, such as in its ability to absorb water. After compaction, it is difficult for roots to penetrate because the soil holds less oxygen and water.

**soil productivity** – The capacity of a soil to produce a specific crop. Productivity depends on adequate moisture and soil nutrients as well as favorable climate.

**stand** – A group of trees in a specific area that are sufficiently alike in composition, age, arrangement, and condition to be distinguishable from the forest in adjoining areas.

**stand density** – Refers to the number of trees growing in a given area, usually expressed in trees per acre.

**stand structure** –The mix and distribution of tree sizes, layers, and ages in a forest. Some stands are all one size (single-story), some are two-story, and some are a mix of trees of different ages and sizes (multistory).

**structural stage** – Classification of forest stands by developmental stage and size based on the size and vertical and horizontal arrangement of trees. Structural stages include:

> ***stand initiation (SI)*** – A single canopy stratum of seedlings and saplings established after a stand-replacing disturbance.
>
> ***stem exclusion closed canopy (SECC)*** – A single canopy stratum of pole to small saw sized timber that excludes an understory by shade.

***stem exclusion open canopy (SEOC)*** – A single canopy stratum of pole to small saw sized timber that excludes an understory by lack of water.

***understory reinitiation (UR)*** – The overstory has been opened up by natural mortality or thinning, allowing an understory to become established.

***young forest multi strata (YFMS)*** – Multiple canopy layers provide vertical and horizontal diversity with a mix of tree sizes. Large trees are absent or at low stocking levels.

***old forest multi strata (OFMS)*** – Large trees are frequent, has multiple canopies.

***old forest single strata (OFSS)*** – Large trees are frequent, limited understory and one canopy level.

**subsoiling** – A treatment to loosen compacted soil at the compacted layer without inversion and with a minimum of mixing with the tilled zone.

**subwatershed** – A drainage area of approximately 20,000 acres, equivalent to a 6$^{th}$-field hydrologic unit code (HUC). Hierarchically, subwatersheds (6$^{th}$-field HUC) are contained within a watershed (5$^{th}$-field HUC), which in turn is contained within a subbasin (4$^{th}$-field HUC).

**successional stage** – The development of forest communities over time. With a lack of disturbance, forest development generally consists of early, mid, and late successional communities that tend toward a stable climax state.

***early successional*** – Vegetative communities that tend to recolonize a site following a disturbance. These communities tend to be comprised of pioneer species that are fast-growing and shade intolerant. Some examples of early seral tree species include ponderosa pine, western larch, and western white pine.

***late successional*** – Vegetative communities that tend to follow early and mid-successional communities. These communities tend to be comprised of species that are slow growing and shade tolerant. Some examples of late seral tree species include grand fir and subalpine fir.

**surface fire** – Fire that remains on the ground surface.

**sustainability** – (1) Meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land. (2) In commodity production, refers to the yield of a natural resource that can be produced continually at a given intensity of management.

**thinning** – An intermediate cutting method designed to reduce stand density in order to improve growth of the residual trees, enhance forest health, or recover potential mortality resulting from inter-tree competition.

**threatened species** – Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.

**tiering** – In an environmental impact statement (EIS), refers to incorporating by reference the analyses in an EIS of a broader scope. For example, a Forest Service project-level EIS could tier to the analysis in a forest plan EIS; a forest plan EIS could tier to a regional guide EIS.

**tractor logging** – A logging method that uses tractors to carry or drag logs from the stump to a landing.

**underburn** – A burn by a surface fire that can consume ground vegetation and ladder fuels.

**understory** – The trees and woody shrubs growing beneath the overstory.

**vegetation management** – Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

**visual quality objective (VQO) -** A set of measurable goals for the management of forest visual resources.

**watershed** – The entire region drained by a waterway (or into a lake or reservoir). More specifically, a watershed is an area of land above a given point on a stream that contributes water to the stream flow at that point.

**wetlands** – Areas that are permanently wet or intermittently covered with water. Wetlands generally include swamps, bogs, seeps, wet meadows, and natural ponds.

**wildfire** – A human or naturally caused wildland fire that does not meet land management objectives.

**winter range** – That portion of big game's range where animals congregate for the winter.

**yarding** – Hauling timber from the stump to a collection point.

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