Sunrise Vegetation and Fuels Management Project
Draft Environmental Impact Statement

Pomeroy Ranger District
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Cover photo: the view from Elk Point on the Pomeroy Ranger District offers a dramatic panorama of forest vegetation in the headwaters of North Fork Asotin Creek and is a representative portion of the Sunrise project area.

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SUNRISE VEGETATION AND FUELS MANAGEMENT PROJECT
Draft Environmental Impact Statement
Garfield and Asotin Counties, Washington

Abstract: The USDA Forest Service, Umatilla National Forest has prepared a Draft Environmental Impact Statement (DEIS) for the Sunrise Vegetation and Fuels Management Project (Sunrise project) located on the Pomeroy Ranger District. The proposed project will address the needs for: (1) Reducing fuels and vegetation to lessen wildfire effects and promote healthy forests; (2) Improving and maintaining wildlife habitat; (3) Promoting timber production and harvest to meet Forest Plan targets; and (4) Providing timber products to local economies.

Three Alternatives are analyzed, including the No Action Alternative (Alternative A). The Proposed Action (Alternative B), and one additional action alternative (Alternative C). These three alternatives were brought forward for detailed analyses of effects as they best met the purpose and needs for the project as identified by the Interdisciplinary Team (IDT) in internal scoping as well comments from the public in external scoping. Additional documentation, including maps and more detailed analyses of project area resources, may be viewed by appointment at the Pomeroy District Range, 71 W. Main Street, Pomeroy, Washington 99347, or on the project website: https://www.fs.usda.gov/project/?project=45689

Actions proposed on NFS lands under the FEIS and DROD constitute activities that implement the proposed action for the Umatilla National Forest, Pomeroy District and are subject to the agency’s pre-decisional objection process at 36 CFR 218 Subparts A and B. The objection process occurs prior to the Forest Service making a final decision (signing a Final ROD) and will include circulation of the FEIS and DROD. Legal notices to initiate the objection period will be published in the newspapers of record following publication of the Notice of Availability of the final EIS in the Federal Register; objections will be submitted to the responsible official at that time.

The opportunity to provide comments to establish eligibility to object under 36 CFR 218 ends when the 45 day public comment period on the FEIS and DROD ends, as discussed above. Only those individuals who submit timely and specific written comments (36 CFR 218.2) regarding the proposed project or activity during the public comment period are eligible to file an objection (36 CFR 218.24(b)(6)). It is the responsibility of all individuals and organizations to ensure that their comments are received in a timely manner. For issues to be raised in objections, they must be based on previously submitted, specific, written comments regarding the proposed project or activity, and must be attributed to the objector. For objection eligibility, each individual or representative from each entity submitting timely and specific written comments regarding the proposed project or activity must either sign the comments or verify identity upon request (36 CFR 218.24(b)(8)).

Send Comments to: Monte Fujishin, Pomeroy District Ranger
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Electronic Comments: Submit electronic comments on the Sunrise project webpage: http://www.fs.fed.us/nepa/fs-usda-pop.php?project=45689 by selecting the “Comment on Project” link in the “Get Connected” group at the right hand side of the project webpage.

Comments must be received by the end of the 45 days following publication of the legal notice in the newspaper of record. The publication date of the legal notice in the East Oregonian is the exclusive means for calculating the comment period.
SUMMARY

Project Location
The Sunrise Vegetation and Fuels Management Project (henceforth referred to as the Sunrise project) planning area is located on the Pomeroy Ranger District, Umatilla National Forest. It is approximately 33,150 acres, approximately 32,000 acres are identified as National Forest System Lands and is situated in Asotin and Garfield Counties, Washington (Appendix A). The Sunrise project is within portions of:

- Township 7 South, Range. 43 East, Section 6;
- Township 8 North, R. 42 East, Sections 1-5, 8-16, 22-26, and 36;
- Township 8 North, R. 43 East, Section 2-11, 15-22, and 28-33;
- Township 9 North, R. 42 East, Sections 25 and 33-36;
- Township 9 North, R. 43 East, Sections 8, 9, and 13-36; and
- Township 9 North, R. 44 East, Sections 18, 19, 30, and 31.

It is within the Lick Creek and North Fork Asotin Creek subwatersheds of the George Creek – Asotin Creek Watershed. Elevation in the project area ranges from 2400 to 6200 feet.

The Sunrise project area is bordered on the east by the Asotin Creek Wildlife Area, which is owned and managed by the Washington Department of Fish and Wildlife. It contains the entire Asotin Creek Inventoried Roadless Area (IRA) and is adjacent to Wenatchee and Tucannon IRAs. Ecosystems in and around Sunrise project planning area are diverse, ranging from shrub/grasslands to subalpine coniferous forests. There are numerous camping areas, hiking trails, scenic vistas, big game hunting opportunities, huckleberry picking opportunities, and forest products. There are two inholdings owned by the state of Washington within the project boundary, totaling 1,130 acres.

Existing Conditions
An analysis of existing vegetation compared to historical range of variability (HRV) has indicated that additional management is warranted for upland forests of the Sunrise project area. HRV recognizes that ecosystems are complex and experience a range of conditions across which processes are resilient and self-sustaining. When allowed to move beyond the limits of the range of variability, ecosystems inevitably move into a state of disequilibrium or disorganization (Egan and Howell 2001, Holling and Meffe 1996, Kaufmann et al. 1994). HRV uses a range of reference conditions pertaining to the previous several centuries prior to the pre-settlement era – a timeframe defined as the mid-1800s for the northern Blue Mountains.

Forest stand composition, density, and structure in the project planning area has deviated from their respective HRV due to fire suppression and other past forest management practices. A majority of current forest stands originated as a result of fire disturbances occurring up to the early 20th century, and have not experienced fire since then. Late seral tree species, multi-storied structural stages, and high-density stands have become dominant after long periods without disturbance and are more susceptible to disturbance-caused mortality than early seral species. Analysis of forest vegetation conditions in the analysis area and comparison to desired ranges is summarized in Chapter 3 of this document, and revealed the following issues, concerns and/or opportunities:
Dry Upland Forests

Douglas-fir cover types dominate too much of the dry forested landscape and there is too little ponderosa pine cover types compared to the historic range of variability (HRV). Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Understory reinitiation and old forest multi-strata (OFMS) structural stages dominate too much of the dry forested landscape and there is too little stand initiation, stem exclusion, and old forest single stratum (OFSS) structural stages.

For the dry upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment. (see Appendix C for Consistency with Eastside Screens)

Moist Upland Forests

Douglas-fir and subalpine fir/spruce cover types dominate too much of the moist forested landscape and there is too little broadleaved trees, western larch, and lodgepole pine, cover types. Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Old forest multi-strata structural stage dominates too much of the moist forested landscape and there is too little stand initiation, stem exclusion, and old forest single stratum structural stages.

For the moist upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment. (see Appendix C for Consistency with Eastside Screens)

Cold Upland Forest

Spruce/subalpine fir and Douglas-fir cover types dominate too much of the cold upland forested landscape and there is too little of the lodgepole pine cover type. Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Understory reinitiation and old forest multi-strata structural stage dominates too much of the cold forested landscape and there is too little stem exclusion and old forest single-stratum structural stages.

For the cold upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment. (see Appendix C for Consistency with Eastside Screens)

Fire Regime Condition Class (FRCC)

FRCC is a metric which describes the departure from historical fire regimes in terms of fire return intervals and vegetative change from historical composition and density. The FRCC in many stands within the project area have been modified due mainly to past harvest history and fire suppression (Fuels Resource Report page 9). In many areas, the surface and ladder fuels, which historically would have been consumed during periodic wildfires, have increased above
historical levels. Today, fires in dry and moist forests would exhibit moderate to severe effects characterized by high fire severity and intensity on landscapes that historically had low to mixed severity. Without treatment, the project area would continue to transition from a low or moderately altered fire regime (Condition Classes 1 and 2), to a significantly altered fire regime (Class 3), where the risk of losing ecosystem components would be substantially higher. Surface fuel loads would continue to build and ladder fuels would continue to increase as shade-tolerant tree species continue to seed in increasing tree densities and canopy layering. These small trees would serve as ladder fuels that can carry fire from the forest floor to the tree canopy, increasing the likelihood of high severity, stand-replacement wildfires. Wildfires occurring in the project area today would not function as a natural disturbance process within their historical range pertaining to fire size, frequency, intensity, severity, or landscape patterns.

Purpose and Need
The Pomeroy District Ranger has determined that there is a need for action based upon comparisons of the current vegetative and fuel trends in the project planning area and the desired future conditions identified in the Umatilla National Forest Land and Resource Management Plan (Forest Plan, pp 4-3 to 4-14) and recommendations made in the Asotin Watershed Assessment (pp VI-1 to VI-3.) The Asotin Watershed Assessment recommended the use of timber harvest to thin dense stands, reduce the extent of Douglas-fir and/or grand fir, retain pine and larch to convert to early seral species stands, and allow fire prescriptions to reduce fuels. Therefore, purpose of this action is to improve forest heath, vigor, and resilience to fire, insect, and disease. This action is needed to move towards the historical range of variability. Currently, forests are outside their historical pre-fire suppression conditions for species composition, structural diversity, stocking densities, and fuel loadings. In addition, given the Forest Plan management area allocations for big game and wildlife habitat goals (C3, C3A, and C4), District Ranger determined there is a need to continue to provide and manage wildlife habitat and its components (cover and forage) in the Sunrise project planning area.

The response to the purpose and need for this project is identified as follows:

Vegetation – There is a need to move forest vegetative structure, composition, and density toward their HRV. The project would move successional and structural conditions of forests toward desired ranges by converting areas in the OFMS to OFSS, converting areas in the stem exclusion and/or understory reinitiation stages to stand initiation stages and by moving other stands toward old forest as appropriate for the disturbance regime and biophysical characteristics of the site. The Sunrise project would also reduce forest density; in some locations reducing inter-tree competition and improving residual tree health. Treatments within the project would also modify composition to increase the abundance of early-seral species such as ponderosa pine and western larch.

Fuels – There is a need to manage forest stands in Condition Classes 2 and 3 to begin to restore vegetation characteristics and fire return intervals characteristic of historical fire regimes and desired fire regimes. Fuels treatments would be used to lower stand densities; reduce surface, ladder and canopy fuels, increase the relative abundance of fire-tolerant tree species, while improving suppression capabilities on forest land. Landscape burning within the project area would be used to reintroduce and/or perpetuate fire within this fire-dependent ecosystem by utilizing a variety of burning strategies over about 60 percent of the area. In addition to creating vegetative conditions more consistent with desired fire regimes, it would also increase the probability that future fires burn in a manner more consistent with the fire regime associated with the biophysical environment of the site.
**Timber Production** – There is a need to provide sawlogs and wood fiber for utilization by regional and local economies as stipulated in the Forest Plan. Silviculture treatments used to alter tree densities, structural diversity, species composition, and ladder and canopy fuels would generate wood fiber through timber harvest. Personal and commercial use firewood would continue within the project area.

**Wildlife Habitat** – There is a need to reduced fuels and stand densities in order to maintain resilient forest wildlife habitat.

**Alternative A (No Action)**

**Purpose and Design**

- No new management activities as proposed would occur.
- Current biological and physical processes would be allowed to continue along their present path along with associated risks and benefits and serve as a baseline for comparison with other alternatives.
- Responds to the requirement to consider a No Action Alternative (40 CFR §1502.14 (d)).

**Description**

Under the No Action alternative, no activities identified in either action alternative would occur and previously approved ongoing activities such as domestic cattle grazing, wildfire suppression and/or containment, firewood cutting, recreation, and road maintenance (including danger tree removal) would continue. This alternative would allow timber stands, identified at this time as needing treatment, to progress through growth and successional processes at their own rate and in the absence of ecological disturbances. Natural fuels would not be treated to reduce the risk of undesired wildfire intensity or allow for a safer environment for fire-fighting personnel during fire suppression. No tree cutting, tree planting, fuels treatments for natural or activity fuels, landscape prescribed fire, or road decommissioning would be implemented.

**Alternative B (Proposed Action)**

**Purpose and Design**

Alternative B responds to the project purpose and need to modify composition, structure, and density through a combination of activities including tree cutting, mastication, tree planting, and pile, jackpot and landscape broadcast burning. Activities would occur over a 5-10 year period beginning in approximately 2019. No trees equal to or greater than 21 inches in diameter at breast height (DBH) would be cut, under this action alternative and no cutting would occur within PACFISH buffers (see tiering references in chapter 1.7).

Alternative B is most similar to the alternative proposed during scoping, except that acreages have been adjusted to reflect additional field reviews and updated GIS information. Treatments in Alternative B respond to elements identified in the Purpose and Need (Chapter 1) and are designed to accomplish the following objectives, while complying with all applicable laws, rules, and regulations:

- Modify dry, moist, and cold upland forests to move species composition, tree density, and forest structure compatible with the historical range of variability.
• Reduce fuel loading (surface, ladder, and canopy fuels) to a level where periodic low-intensity surface fires can safely be reintroduced and where fuel loads would not contribute to uncharacteristic wildfire size, intensity and resource damage.
• Provide sawlogs and wood fiber products for utilization by local and regional industry.
• Continue to provide and manage wildlife habitat and its components (cover and forage).
• Reduce risk of personal injury by removing danger trees along haul routes used for timber sale activities.

Alternative C

Purpose and Design

Alternative C was developed to more effectively respond to the key issue of wildlife habitat and the potential negative impacts the proposed action could have on elk distribution and habitat quality due to decreased cover and security areas, as well as old forest distribution, old forest connectivity, and snag habitat.

• Modify dry, moist, and cold upland forests to move species composition, tree density, and forest structure compatible with the historical range of variability.
• Reduce fuel loading (surface, ladder, and canopy fuels) to a level where periodic low-intensity surface fires can safely be reintroduced and where fuel loads would not contribute to uncharacteristic wildfire size, intensity and resource damage.
• Continue to provide and manage wildlife habitat and components with emphasis on indicator species habitat such as Rocky Mountain elk.
• Provide sawlogs and wood fiber products for utilization by local and regional industry.
• Reduce risk of personal injury by removing danger trees along haul routes used for timber sale activities.

Major Conclusions

Silviculture

Alternative A, the no action alternative, would result in the existing stand densities, species composition, and structural stages remaining outside of the ranges of variability as determined for the Umatilla forest. Alternative B treatments would create stand conditions closer to the historical range of variability and with improved fire tolerance, meeting the purpose and need. Compared to the treatment acreages within Alternative C, Alternative B would treat more acres and move closer to the desired condition for silvicultural indicators.

Alternative C treatments would also create stand conditions closer to the historical range of variability and with improved fire tolerance, but to a lesser degree than Alternative B.

Alternative A, the no action alternative, would result in the action area continuing to develop increasing fuel loads, increasing the chance of crown fires. High fire class conditions would also remain overrepresented when compared to the historical range of variation.

Alternative B would result in a decrease of fuel loads in treated areas. This would improve the representation of low-severity fire classes with the project area and reduce the likelihood of crown fires.
Alternative C would also result in a decrease of fuel loads in treated areas. Compared to Alternative B it treats few acres over all, and thus would decrease fuel loads somewhat less. This alternative would still help move the representation of low-severity fire classes more towards the historical range of variability and reduce the likelihood of crown fires in treated areas.

**Wildlife**

Alternative A, the no action alternative, would not result in any disturbance to management indicator, threatened, endangered or sensitive species. However, continued fuels build up and increasing stand densities would create conditions for a potential large scale habitat reduction for forest canopy dependent species.

Alternative B would result in a considerable change of forest conditions in the area, affecting wildlife in various ways depending on the species. The distribution of elk cover would be less than desirable. A substantial amount of old forest would be affected by changing it from OFMS to OFSS. Creating more resilient forest through stand density reduction, fuels reduction and landscape burning would overall benefit most species in the long term.

Alternative C would change forest conditions but at a lesser magnitude than Alternative B. The balance of improving habitat for some species (e.g. increases in dry OFSS) and decreasing the amount of habitat for other species (e.g. marten, elk cover) is more in balance, while still reducing fuels to a more natural level.

**Fisheries**

Alternative A does not include any actions within riparian corridors and therefore would have no impact on fish or other aquatic species.

Alternative B and C both contain required design criteria which should prevent treatment activities from impacting fish and other aquatic species.

**Hydrology**

Alternative A is not expected to impact hydrologic function.

Alternative B and C may contribute to negative cumulative impacts on water yield in several watersheds if this action is undertaken simultaneously with other planned actions. However, this is unlikely as planned actions are expected to take place over a period of several years.

**Soils**

Alternative A is not expected to negatively impact soils; however no remediation of past activities will occur either.

Alternative B and C authorize activities that are expected to have short-term negative impacts on soils. However, decommissioning of temporary roads and project design criteria will minimize long-term impacts on soils.

**Botany**

Alternative A is not expected to detrimentally impact the threatened Spaulding’s catchfly or sensitive plant species.
Alternative B and C may negatively impact habitat for sensitive species, but are not expected to contribute to a need for listing. Project design criteria will protect Spaulding’s catchfly from impacts.

**Invasive Plants**

Alternative A is not expected to directly result in the spread of invasive plants, although there may be an indirect impact if a damaging fire were to occur from increasing fire risk.

Alternative B and C will result in increased risk of the spread of invasive plants, correlating with the amount of ground disturbance in each alternative. Project design criteria will help mitigate, but not completely eliminate this risk.

**Visual Resources**

Alternative A would have no impacts on visual resources.

Alternative B and C would have minor, short-term negative impacts as disturbance from activities occurred. Long-term, these alternatives would have positive impacts on the visual resources by helping blend the visual components of past treatments.

**IRAs**

Alternative A would not be expected to impact Inventoried Roadless Areas.

Alternatives B and C would have some minor and short-term, negative impacts within areas undergoing timber treatment.

**Recreation**

Alternative A would not be expected to impact recreation within the project area.

Alternatives B and C may both result in some short-term localized displacement of dispersed recreation users, depending on the timing of prescribed burns. No changes to the Recreation Opportunity Spectrum are expected.

**Air Quality**

Alternative A would not be expected to have a direct impact on air quality. Indirect impacts may occur if potentially larger wildfires result from the lack of action.

Alternatives B and C would contribute to short-term negative impacts on air quality during prescribed burning activities.

**Range**

Alternative A would have no impacts on the quality of range within the action area.

Alternatives B and C would temporarily reduce forage after prescribed burning but have a positive effect as forb and grass cover rebound post treatment.

**Economics**

Alternative A would not produce timber products and therefore would not contribute to the economic stability of the nearby communities.
Alternative B would produce approximately 25 mbf and Alternative C would produce approximately 12 mbf and contribute to the economic stability of nearby communities by providing forest products.
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Chapter 1. Purpose and Need

1.1 Introduction

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

- **Purpose of and Need for Action (Chapter 1):** briefly describes the proposed action, the need for that action, and other purposes to be achieved by the proposal. This section also details how the Forest Service informed the public of the proposed action and how the public responded.

- **Alternatives (Chapter 2):** provides a detailed description of the agency’s proposed action as well as two alternative actions that were developed in response to comments raised by the public during scoping. It describes the key management direction used in developing the project which comes from the Forest Plan of the Umatilla National Forest. The end of the chapter includes summary tables comparing the proposed action and alternatives with respect to the activities proposed for each alternative, how each addresses the purpose and need of the project, how each addresses relevant issues, and their environmental effects.

- **Affected Environment and Environmental Consequences (Chapter 3):** describes the affected environment and environmental effects of the proposed action and alternatives on forest resources and the overall response from the Forest to responsible opposing views.

- **Consultation and Coordination (Chapter 4):** provides a list of preparers and agencies consulted during the development of the EIS.

- **Appendices:** The appendices provide more detailed information to support the analyses presented in the EIS. Maps of the alternatives and other maps for this document are located in Appendix A. Planning unit treatments by alternative are listed in Appendix B. Additional appendices are included as needed to provide support to specialist reports.

Additional documentation, including maps and more detailed analyses of project area resources, may be viewed by appointment at the Pomeroy District Range, 71 W. Main Street, Pomeroy, Washington 99347 or on the project website: [https://www.fs.usda.gov/project/?project=45689](https://www.fs.usda.gov/project/?project=45689).

1.2 Project Location

The Sunrise Vegetation and Fuels Management Project (henceforth referred to as the Sunrise project) planning area is located on the Pomeroy Ranger District, Umatilla National Forest. It is approximately 33,150 acres, approximately 32,000 acres are identified as National Forest System Lands and is situated in Asotin and Garfield Counties, Washington (Appendix A). The Sunrise project is within portions of:

- Township 7 South, Range. 43 East, Section 6;
- Township 8 North, R. 42 East, Sections 1-5, 8-16, 22-26, and 36;
- Township 8 North, R. 43 East, Section 2-11, 15-22, and 28-33;
- Township 9 North, R. 42 East, Sections 25 and 33-36;
- Township 9 North, R. 43 East, Sections 8, 9, and 13-36; and
The Sunrise project area is bordered on the east by the Asotin Creek Wildlife Area, which is owned and managed by the Washington Department of Fish and Wildlife. It contains the entire Asotin Creek Inventoried Roadless Area (IRA) and is adjacent to Wenatchee and Tucannon IRAs. Ecosystems in and around Sunrise project planning area are diverse, ranging from shrub/grasslands to subalpine coniferous forests. There are numerous camping areas, hiking trails, scenic vistas, big game hunting opportunities, huckleberry picking opportunities, and forest products. There are two inholdings owned by the state of Washington within the project boundary, totaling 1,130 acres.

1.3 Existing Condition

Forest Composition, Structure, and Density
An analysis of existing and historical vegetation (see Vegetation Report) has indicated that additional management is warranted for upland forests of the Sunrise project area. The historical range of variability (HRV) recognizes that ecosystems are complex and they experience a range of conditions across which processes are resilient and self-sustaining. When allowed to move beyond the limits of the range of variability, ecosystems inevitably move into a state of disequilibrium or disorganization (Egan and Howell 2001, Holling and Meffe 1996, Kaufmann et al. 1994). HRV uses a range of reference conditions pertaining to the previous several centuries prior to the pre-settlement era – a timeframe defined as the mid-1800s for the northern Blue Mountains.

Forest stand composition, density, and structure in the project planning area have been altered from historical ranges of variation due to fire suppression and other past forest management practices. A majority of current forest stands originated as a result of fire disturbances occurring up to the early 20th century, and have not experienced fire since then. Late seral tree species, multi-storied structural stages, and high-density stands have become dominant after long periods without disturbance and are more susceptible to disturbance-caused mortality than early seral species. Analysis of forest vegetation conditions in the analysis area and comparison to desired ranges is summarized in Chapter 3 of this document, and revealed the following issues, concerns and/or opportunities:

Dry Upland Forests
- Douglas-fir cover types dominate too much of the dry forested landscape and there is too little ponderosa pine cover types compared to the historic range of variability (HRV). Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Understory reinitiation and old forest multi-strata (OFMS) structural stages dominate too much of the dry forested landscape and there is too little stand initiation, stem exclusion, and old forest single stratum (OFSS) structural stages.
- For the dry upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment (see Appendix C for Consistency with Eastside Screens.)
Moist Upland Forests

- Douglas-fir and subalpine fir/spruce cover types dominate too much of the moist forested landscape and there is too little broadleaved trees, western larch, and lodgepole pine, cover types. Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Old forest multi-strata structural stage dominates too much of the moist forested landscape and there is too little stand initiation, stem exclusion, and old forest single stratum structural stages.

- For the moist upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment (see Appendix C for Consistency with Eastside Screens)

- Spruce/subalpine fir and Douglas-fir cover types dominate too much of the cold upland forested landscape and there is too little of the lodgepole pine cover type. Within this biophysical setting, there are too many areas with high forest density, and too few areas with low and moderate density. Understory reinitiation and old forest multi-strata structural stage dominates too much of the cold forested landscape and there is too little stem exclusion and old forest single-stratum structural stages.

- For the cold upland forest biophysical environment, there is too little of the OFSS late-old structural stage and too much of the OFMS stage. Since one of the late-old structural stages is below HRV, scenario A of the wildlife screen (one of six Eastside Screens, an amendment to the Umatilla Forest Plan) will apply for this biophysical environment (see Appendix C for Consistency with Eastside Screens.)

Fire Regime Condition Class

Fire Regime Condition Class (FRCC), is a metric which describes the departure from historical fire regimes in terms of fire return intervals and vegetative change from historical composition and density. The FRCC in many stands within the project area has been modified primarily by past harvest history and fire suppression (Fuels Resource Report page 9). In many areas, the surface and ladder fuels, which historically would have been consumed during periodic wildfires, have increased above historical levels. Today, fires in dry and moist forests would exhibit moderate to severe effects characterized by high fire severity and intensity on landscapes that historically had low to mixed severity. Without treatment, the project area would continue to transition from a low or moderately altered fire regime (Condition Classes 1 and 2), to a significantly altered fire regime (Class 3), where the risk of losing ecosystem components would be substantially higher. Surface fuel loads would continue to build and ladder fuels would continue to increase as shade-tolerant tree species continue to seed in increasing tree densities and canopy layering. These small trees would serve as ladder fuels that can carry fire from the forest floor to the tree canopy, increasing the likelihood of high severity, stand-replacement wildfires. Wildfires occurring in the project area today would not function as a natural

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1 **Condition Class** Describes the departure from historic fire regimes in terms of fire return interval and vegetative changes from historical composition and density (Hann and Bunnell, 2001). Class 1 – within historical range; Class 2 – moderately altered from historical range; and Class 3 – significantly altered from historical range.

2 **Fire regime:** Class 1 – 0 to 35-year frequency and of low severity (most commonly associated with surface fires) to mixed severity (in which less than 75 percent of the dominant overstory vegetation is replaced). Class 3 – 35 to 200-year frequency and of mixed severity. Less than 75% of the dominate overstory vegetation is replaced.
disturbance process within their historical range pertaining to fire size, frequency, intensity, severity, or landscape patterns.

1.4 Purpose and Need for Action

The need for the Sunrise project arises from an interdisciplinary evaluation or assessment of the differences or gap between the existing conditions as delineated above and the desired future conditions as identified in this document as well as the Umatilla National Forest Land and Resource Management Plan (Forest Plan, pp.4-3 to 4-14). The purpose of this project is to modify vegetation and fuels by moving vegetation composition, structure, density, and fuels closer to desired conditions as described in the following sections. Forest Plan objectives require providing sawlogs and wood fiber products for utilization by regional and local industries is also considered a need for this project. Furthermore, because the majority of acres (about 19,200 acres) in the project planning area are Forest Plan management area allocations with big game and wildlife habitat goals (C3, C3A, and C4) there is a need to continue to provide and manage wildlife habitat and its components (cover and forage) in the Sunrise project planning area. The need for this project is identified in further detail as follows:

Vegetation – There is a need to move forest structure, species composition, and stand density toward their HRV. By moving these forest attributes more toward HRV, ecosystem processes, such as response to wildfire, insects and disease, are more resilient and self-sustaining (Egan and Howell 2001, Holling and Meffe 1996, Kaufmann et al. 1994). The project would move successional and structural conditions of forests toward desired ranges by converting areas in the Old Forest Multi-Strata structural stage to the Old Forest Single Stratum stage, converting areas in the Stem Exclusion and/or Understory Reinitiation stages to Stand Initiation stages and by moving other stands toward Old Forest as appropriate for the disturbance regime and biophysical characteristics of the site.

Additionally, there is a need to reduce forest density in some locations as reducing inter-tree competition will improve residual tree health. Treatments within the project would also modify species composition, increasing the abundance of early seral species such as ponderosa pine and western larch.

Fuels – There is a need to modify forest stands in Condition Classes 2 and 3 to begin to restore vegetation characteristics and fire return intervals characteristic of historical fire regimes and desired fire regimes. Fuels treatments would be used to lower stand densities; reduce surface, ladder and canopy fuels; increase the relative abundance of fire-tolerant tree species, while improving suppression capabilities on forest land. Landscape burning within the project area would be used to reintroduce and perpetuate fire within this fire-dependent ecosystem by utilizing a variety of burning strategies over about 60 percent of the area. In addition to creating near-term conditions, more consistent with desired fire regimes, it would also increase the probability that future fires burn in a manner more consistent with the fire regime associated with the biophysical environment of the site.

Timber Production – There is a need to provide sawlogs and wood fiber to augment the regional and local economies due to the dependency on timber production from the Forest. Silvicultural treatments used to alter tree densities, structural diversity, species composition, and ladder and canopy fuels would generate wood fiber through timber harvest. Personal and commercial use firewood would continue within the project area.
Wildlife Habitat – There is a need to continue to provide and manage, over time, for wildlife habitat, as it is required to meet Forest Plan goals and management area standards and guidelines.

1.5 Management Direction

Umatilla Forest Plan

The Umatilla National Forest Land and Resource Management Plan, as amended (Forest Plan, 1990) includes multiple-use forest-wide goals and objectives for management of the National Forest. Forest-wide goals apply to all areas of the forest, whereas allocated management area (MA) goals are applied to specific management areas. Below is a listing of Forest Plan forest-wide goals, desired conditions, and relationship of those items to the project purpose and need.

Forest Plan forest-wide goals (FP pp. 4-1 to 4-3) that are most applicable to the purpose and need identified for this project are as follows:

- **Forest Plan Goal 1** – Provide land and resource management that achieves a more healthy and productive forest and assists in supplying lands, resources, uses, and values which meet local, regional, and national social and economic needs.
- **Forest Plan Goal 9** – Provide and manage big game (elk and deer) habitat and its components (cover, forage, and roads) to assist in meeting states wildlife agency population management objectives.
- **Forest Plan Goal 13** – Provide for diversity of plant and animal communities and species consistent with overall multiple-use objectives for the Forest. Maintain or enhance ecosystem functions to provide for the long-term integrity (stability) and productivity of biological communities.
- **Forest Plan Goal 15** – Provide for production and sustained yield of wood fiber and insofar as possible meet projected production levels consistent with various resource objectives, standards and guidelines, and cost efficiency.
- **Forest Plan Goal 25** – Provide and execute a fire protection and fire use program that is cost efficient and responsive to land and resource management goals and objectives.

Forest Plan allocated management areas (MA), each of which emphasizes a particular desired future condition (DFC) contain standards and guidelines to provide direction for achieving DFCs. The Forest Plan designates management areas as the way to characterize the landscape for the type and intensity of management activities that may occur on Umatilla National Forest lands. Management areas within the project planning area are listed below and shown in Map 2 of Appendix A.

Sunrise project area contains portions of nine different Management Areas, the largest of which is **C4: Wildlife Habitat** (36% of project area), followed closely by **C8: Grass-Tree Mosaic** (29%).

Table 1-1 shows the acreage and percent of the total project area by Management Area.

<table>
<thead>
<tr>
<th>Management Area Allocation</th>
<th>Acres</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4: Viewshed 2</td>
<td>1,135</td>
<td>4</td>
</tr>
<tr>
<td>A6: Developed Recreation</td>
<td>20</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Pomeroy Ranger Districts
<table>
<thead>
<tr>
<th>Management Area Allocation</th>
<th>Acres</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Dedicated Old Growth</td>
<td>1,785</td>
<td>6</td>
</tr>
<tr>
<td>C3: Big Game Winter Range</td>
<td>4,280</td>
<td>13</td>
</tr>
<tr>
<td>C3A: Sensitive Big Game Winter Range</td>
<td>3,255</td>
<td>10</td>
</tr>
<tr>
<td>C4: Wildlife Habitat</td>
<td>11,650</td>
<td>36</td>
</tr>
<tr>
<td>C5: Riparian (Fish and Wildlife)</td>
<td>490</td>
<td>2</td>
</tr>
<tr>
<td>C8: Grass-Tree Mosaic</td>
<td>9,230</td>
<td>29</td>
</tr>
<tr>
<td>E2: Timber and Big Game</td>
<td>160</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

Following are brief descriptions of goals, desired conditions, and relationship to the project purpose and need associated with each Forest Plan management area allocation located within Sunrise project planning area. Detailed descriptions for each area can be found in the Forest Plan (FP pages 4-94 to 4-186). The Sunrise project purpose and need revolves around the concepts of forest vegetation, density, structure, and fire regime condition class, but also responds to the goals below by maintaining or enhancing the desired conditions for each management area. Desired conditions would be maintained or enhanced via planned activities and design criteria described in detail in Chapter 2 with detailed analysis of effects included in Chapter 3.

**A4 Viewshed 2—Goal:** Manage the area seen from a travel route, use area, or water body where some forest visitors have a major concern for the scenic qualities (sensitivity level 2) as a natural appearing to slightly altered landscape

**Desired Future Condition:** Viewsheds will be managed primarily to meet the visual quality objectives of partial retention and modification. An attractive, near natural landscape will be maintained or created.

**A6 Developed Recreation—Goal:** Provide recreation opportunities that are dependent on the development of structural facilities for user conveniences where interaction between users and evidence of others is prevalent.

**Desired Future Condition:** Readily accessible, appropriately designed recreation facilities shall provide for concentrated use by people seeking a variety and convenience of developed recreation opportunities and experiences. Recreationists will enjoy outdoor opportunities where social interactions are moderate to high. Controls and regulations will be noticeable to obvious.

**C1 Dedicated Old Growth—Goal:** Provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or over-mature forest stands, and promote a diversity of vegetative conditions for such species.

**Desired future condition:** Old-growth areas will be characterized by stands of naturally appearing over-mature trees. Stands of mature trees may be included in the old growth category to provide a better distribution of this habitat type throughout the forest. Trees in these stands are relatively large (with many trees greater than 21 inches dbh); past the point of rapid growth, and some have visible evidence of decay and decline including mycorrhizal fungi and other microorganisms. Stands will be dispersed in quantities and sizes which meet the needs of dependent wildlife. These stands will contribute toward the forest diversity and aesthetic values.
C3  **Big Game Winter Range—Goal:** Manage big game winter range to provide high levels of potential habitat effectiveness and high quality forage for big game.

**Desired Future Condition:** Big game winter ranges will appear as a mosaic of managed forests, brush patches, and large grasslands. Forested areas will contain a mix of harvested even-aged, uneven-aged, and natural stands, creating patterns of cover patches and forage areas for big game. Areas of early spring green-up and other forage changes due to prescribed fires and other means will occur in a mosaic pattern over the winter ranges; quality forage will be abundant because of management.

C3A  **Sensitive Big Game Winter Range—Goal:** Manage sensitive areas of big game winter range to provide high levels of potential habitat effectiveness (at or above the current levels).

**Desired Future Condition:** The area will appear as a mosaic of plant communities, including grassland forage area, brush, and some stands of trees. Use of prescribed fire will be apparent and carried out to maintain or increase the quality and quantity of forage and amount of cover on the area. Areas of early spring forage green-up due to prescribed fire will occur in a mosaic pattern over the winter range. Increased forage and cover will help encourage big game use on public lands and discourage high levels of winter use on the adjacent private lands. Most roads and trails will be closed to vehicle traffic during the winter, and there will be minimum human disturbance to big game during this period.

C4  **Wildlife Habitat—Goal:** Manage Forest Lands to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphases on size and distribution of habitat components (forage and cover areas for elk, snags and dead and down materials for all cavity users) unique wildlife habitats and key use areas will be retained or protected.

**Desired Future Condition:** The forest will be a mosaic of even-aged and uneven-aged stands dispersed in a manner to create a pattern of forage, and marginal and satisfactory cover for big game.

C5  **Riparian (Fish and Wildlife)—Goal:** Maintain or enhance water quality, and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game.

**Desired Future Condition:** A near natural setting will predominate adjacent to the stream, with a wide variety of plant communities of various species, sizes, and age classes. In forested riparian zones, a continuous high tree canopy layer will be present and the forest will appear denser than in the surrounding land. Upper and mid-level conifer and hardwood canopy structure and lower shrub level will provide desired levels of stream surface shading, streambank stability, and satisfactory cover for big game.

C8  **Grass – Tree Mosaic—Goal:** On areas known as grass-tree mosaic (GTM), provide high levels of potential habitat effectiveness, high quality forage for big game wildlife species, visual diversity, and protect erosive soils.

**Desired Future Condition:** Generally these areas will remain natural appearing with the predominate view being made up of patches or stringers of timber occurring on open, generally steep hillsides. Many forest stands will appear as mature timber with some having multi-layered canopies. Some stands will be more open as the result of
management activities designed to improve big game habitat. Areas of early spring forage green-up will occur in a mosaic pattern over the winter range portion of this area. Quality big game habitat will be maintained and enhanced, thereby helping to achieve big game management population and productivity goals. In addition, during an average winter, most of the wintering big game will remain on public lands, helping to keep impacts to private lands low.

**E2 Timber and Big Game—Goal:** Manage Forest Lands to emphasize Production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat.

**Desired Future Condition:** Management of forests for timber production, domestic livestock, big game, and other wildlife habitat will be apparent. Forests will contain a mosaic of even-aged and uneven-aged stands dispersed in a manner creating patterns of tree cover for big game and openings providing forage. Created opening will range from 1-3 acres up to 40 acres, but will often be 20-30 acres in size. Horizontal and vertical diversity will be apparent; tree species will be diverse, but seral, more pest-free species such as ponderosa pine, western larch, and lodgepole pine will predominate. Accumulated fuels will be generally light, and large destructive fires will seldom occur. Prescribe fire will continue to be an important management tool.

Vegetation management, including tree harvest and prescribed burning, would occur in management areas A4, A6, C3, C3A, C4, and E2. No mechanical tree-cutting activities are proposed in PACFISH-designated Riparian Habitat Conservation Areas (RHCAs) or within the IRA.

### 1.6 Proposed Action

The Pomeroy District Ranger proposes the following action and associated activities that may occur concurrently for this project. This proposed action is in response to the purpose of and need for action identified above as refined by internal and external scoping comments. A more detailed description of the proposed action can be found in Chapter 2 of this document. Vegetation and fuels treatments are anticipated to continue over a period of approximately three to ten years following the signature of the final Record of Decision.

**Timber harvest and other tree-cutting activities**

The project would include mechanical tree-cutting activities across approximately 7,790 acres. Intermediate tree-cutting would be used to modify the growth, vigor, composition, or structure of a forest stand after its establishment and prior to its final harvest (approximately 5,660 acres). In other areas where thinning treatments alone will not meet landscape vegetation and fuels-related objectives, regeneration harvests (i.e. clearcut, shelterwood, seed tree, etc.) and tree planting would occur (up to approximately 2,130 acres). Treatments would be designed to promote underrepresented, early seral tree species such as ponderosa pine and western larch. Harvest methods would include a combination of conventional ground-based\(^3\) (approximately 3,310

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\(^3\) **Conventional ground based logging system:** This is tractor or skidder yarding on trails spaced approximately 100 feet apart. Skidding equipment would be required to remain on the trails and logs dragged to the landings with one end suspended. Mechanical felling equipment may be used to fall and bunch logs near the trail and be allowed a single pass between skid trails to reduce compaction concerns.
acres) and cable/skyline\(^4\) yarding systems (approximately 2,210 acres). Activity units could include the removal of sawlogs, small diameter trees (generally less than 7.0 inches diameter at breast height (DBH)) and/or excess down wood for use as woody biomass \(^5\) products. Units within the Lick Creek area would receive only the cutting of small-diameter trees. Tree-cutting objectives and activities would vary depending on existing forest vegetation and fuels conditions as well as wildlife habitat needs. Although wood fiber utilization is expected in some areas, the focus of each treatment would be on the desired conditions of each activity area and designed to move vegetation characteristics towards those desired conditions. No trees greater than or equal to 21 inches DBH would be cut, under any action alternative.

**Fuels Treatments (activity and natural)**
Activity fuels and existing natural fuels would be treated in harvest units. A combination of the following treatments (more than one treatment may occur on an acre) would occur: prescribed burning of activity fuels (approximately 877 acres), mechanical grapple piling of activity fuels (approximately 1,068 acres), and yarding with tops attached. Non-commercial hand thinning (about 1,680 acres) and mechanical thinning (about 590 acres) would be used to treat ladder fuels in both harvest activity units and natural fuels units where high density small diameter understory remain. If it is economically feasible, material from 3 to 10 inches DBH would be removed as a woody biomass product, if it is not economically feasible, mechanical fuel treatments would be treated by mastication.

**Landscape Prescribed Fire**
Landscape prescribed fire could occur across approximately 14,055 acres within the Sunrise project area. The project area would be burned when fire intensity could be kept low to facilitate the likelihood of reducing surface and ladder fuels while limiting the incidences and size of individual tree and group torching. This would result in lower stand densities, increased abundance of fire-tolerant species, reduced existing ladder, surface, and canopy fuels, while improving suppression capabilities on forest land, and re-introducing landscape-scale fire into the ecosystem. Upon completion, landscape could be described as a mosaic of unburned, lightly burned, moderately burned, and intensely burned patches.

**Road Management**
To accomplish implementation of proposed activities approximately 39 miles of closed\(^6\) system roads (operational maintenance level 1\(^7\)), and 52 miles of seasonally\(^8\) open roads (operational maintenance level 2\(^9\) and 3\(^10\)) would be used as haul routes. Closed system roads used for project activities would not be opened to the public. All system roads would remain the same after

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\(^4\) **Skyline logging system**: In a skyline system, logs are yarded up the hill by a system of cables, and logs are either partially or fully suspended to reduce soil disturbance. Skyline yarding landings are slightly smaller than conventional ground-based systems.

\(^5\) **Woody Biomass**: Trees and woody plants, including limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, or rangeland environment, that are the by-products of forest management.

\(^6\) **Closed Road**: These roads are not available for motorized vehicle travel for everyday access and are gated or closed by barricades. These roads can be opened for access for resource management activities or fire suppression. Snowmobile use is allowed except where specifically prohibited.

\(^7\) **Operational maintenance level 1**: The operational objective is closed more than 1 year.

\(^8\) **Seasonally Open Roads**: These roads are available for public motorized vehicle use only during specified seasons.

\(^9\) **Operational maintenance level 2**: The operational objective is for high clearance vehicles.

\(^10\) **Operational maintenance level 3**: The operational objective is for passenger vehicles – road surface is not smooth.
project implementation; open roads would remain open, closed roads would continue to be closed, and seasonally open roads would continue with that designation. Approximately 14 miles of temporary road would be constructed; of which 8 miles would be constructed over previous road templates. All temporary roads would be decommissioned after project activity use. No new specified permanent road construction is proposed.

Danger Tree Removal
Danger trees\(^{11}\) would be felled and removed along all previously described haul routes used for timber sale activity. If considered economically feasible they would be sold as part of a timber sale. Danger trees within Riparian Habitat Conservation Areas (RHCAs) would not be removed; they would be cut and left to provide additional coarse woody debris.

1.7 NEPA Document Preparation
NEPA Documentation Relying on resource reports and the project file helps implement the CEQ’s regulation provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), through incorporation by reference, keeping documents analytic rather than encyclopedic, and keeping NEPA documents no longer than absolutely necessary (40 CFR 1502.2). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental effects of the alternatives and how these effects can be mitigated, without repeating detailed analysis and background information available elsewhere.

Project Administrative Record
This EIS hereby incorporates by reference the project file (40 CFR 1502.21). The project file contains resource specialist reports and other technical documentation used to support the analysis and conclusions in this EIS; as well as all decision making documentation Specific information on methodologies, assumptions, and limitations of analysis and other details are contained in specialist reports. The following specialist reports are included in the project file: soils, hydrology, fisheries, wildlife, botany, vegetation (including historical range of variability, insects and disease, and invasive plants), fuels, air quality, transportation system (roads), economics, recreation, visuals/scenery, inventoried roadless areas, potential wilderness areas, other undeveloped lands, and cultural resources. Other sources of information, documents, published studies, and books referred to in this document are also included in the project file which is located at Pomeroy Ranger District office.

Tiering and Incorporating by Reference
In order to eliminate repetition and focus on site-specific analysis, this DEIS is tiered to the following documents as permitted by 40 CFR 1502.20. When incorporating information sources by reference, this document and resource specialist reports summarize the source’s analysis and conclusions, and explain its relevance to the Sunrise project analysis.

Umatilla National Forest Land and Resource Management Plan FEIS and Record of Decision (ROD) dated June 11, 1990 and all subsequent NEPA analysis for amendments. The

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\(^{11}\) Danger Trees: A danger tree is defined as any standing tree that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction and lean of the tree (FSH 6709.11, Glossary). Trees will be felled that have an imminent or likely potential to fail. Trees that have an imminent potential to fail are so defective or rotten that it will take little effort to make them fail. Trees considered likely to fail include all dead trees and some live trees with specific diseases and/or damage.
FEIS contains analyses of resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

This DEIS also incorporates by reference the following documents:

**Umatilla National Forest Land and Resource Management Plan (Forest Plan)** dated June 11, 1990, and all subsequent Forest Plan amendments. The Forest plan provides programmatic direction for the Forest, including Sunrise project planning area. Relevant Forest Plan amendments for this project are summarized below:

**Forest Plan Amendment #10.** The Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) dated February 24, 1995. PACFISH provided further protection for fish habitat, particularly regarding activities within riparian areas.

**Forest Plan Amendment #11.** Continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (Regional Forester’s Amendment No. 2, Screens) dated June 12, 1995. The Screens (Eastside Screens) established additional management direction regarding riparian management (screen 4), ecosystem diversity (screen 5), and wildlife structural diversity, connectivity of late/old structure, retention of snags and downed wood, and goshawk nest-sites (screen 6).

**Forest Plan Amendment #30.** Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program, 2005, hereby referred to as the R6 2005 FEIS. The R6 2005 FEIS culminated in a Record of Decision (R6 2005 ROD) that amended the Umatilla National Forest Plan by adding management direction relative to invasive plants.

The **Biological Opinion for the Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH)** from National Marine Fisheries Service dated January 23, 1995. PACFISH itself does not propose any ground-disturbing actions, but sets in place certain riparian management goals and management direction with the intent of arresting the degradation and beginning the restoration of riparian and stream habitats. Habitat for anadromous fish is present in the watersheds analyzed for this project.


provisions of this Opinion, in combination with implementation of PACFISH, should provide reasonable certainty that site-specific actions will not result in jeopardy to listed salmon or adverse modification of critical habitat. This applies to the Land and Resource Management Plan for Umatilla National Forest and PACFISH amendment used for this project.


Blue Mountain Expedited Section 7 Consultation Process – Consultation with the Level 1 Team Agreement (U.S. Forest Service, NOAA Fisheries, and U. S. Fish and Wildlife Service) will be occurring in May 2018. The project is tiered to Letters of Concurrence for the Blue Mountain Expedited Section 7 Consultation Process (Blue Mountain Project Design Criteria (PDC)) received from Fish and Wildlife Service, June 4, 2007 and NOAA Fisheries dated May 31, 2007 will. Level 1 Team letter will fulfill requirements for Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation.

Bull Trout Critical Habitat Designated in 2010: Letter dated November 16, 2010 from U. S. Fish and Wildlife Service, confirmation of Conference Reports and Conference Opinion as Letters of Concurrence and a Biological Opinion for Multiple Wallowa-Whitman National Forest Actions Involving Proposed Bull Trout Critical Habitat. This letter transmits confirmation of previously completed conference documents for actions described in the letter. Date of informal conference (13420-2010-1C-0150) for Umatilla National Forest is July 30, 2010. The purpose of this letter is to adopt the conference report as a Letter of Concurrence for designated bull trout critical habitat for the Blue Mt. Expedited Section 7 Consultation Process. Habitat for bull trout is present in the watershed analyzed for this project.

National Forests in Oregon and Washington received the biological opinions “Fish Habitat Restoration Activities in Oregon and Washington CY2007-2012 Biological Assessment and associated Biological Opinions, reissued by NMFS on June 27, 2008: NMFS BO (FS 2008/03505), FWS BO (13420-2007-F-0055)” (referenced as ARBO). To address the 2010 designation of bull trout critical habitat, the ARBO for FWS was reinitiated by the Forest Service, and a resulting Biological Opinion and Letter of Concurrence dated April 26, 2011 on the Programmatic Aquatic Habitat Restoration Activities in Oregon and Washington that Affect ESA-Listed Fish, Wildlife, and Plant Species and Their Critical Habitats (TAILS #13420-2011-F-0129) was released. This process was used for Sunrise project.

Asotin Watershed Assessment, Umatilla National Forest, Pomeroy Ranger District, January 18, 1996. A watershed-level ecosystem analysis of current and reference conditions along with recommendations for restoration. Sunrise Project is located in the Asotin Watershed and recommendations from this assessment were considered for this project.

Invasive Plants Treatment Project (EIS), Umatilla National Forest, decision dated July 2010. Authorizes treatment of invasive plant species over a 5-15 year period using manual, mechanical, biological, herbicide, and cultural treatments. Up to 4,000 acres may be treated annually, including known sites and those detected in the future. Invasive plants in the project planning area will be treated as identified in this EIS (Chapter 3, Table 3-57).
Environmental Assessment for Pomeroy Ranger District Motorized Access and Travel Management Plan, Pomeroy Ranger District, July 1993. A comprehensive program resulting in a transportation system which provides for a broad mix of both motorized and non-motorized recreation opportunities while moving toward Forest Plan desired future conditions. The transportation system for this project is consistent with this EA.

Analysis of Umatilla National Forest Road System, completed January 2004. Forest-scale analysis in determining the minimum road system needed to meet resource and other management objectives. Transportation actions for this project are consistent with this Forest scale analysis.

The Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin released 1996. Links landscape, aquatic, terrestrial, social, and economic characterizations to described biophysical and social systems. Biological and social systems for this project are described in Chapter 3 of this EIS.

Umatilla National Forest Interim Snag Guidance Letter dated April, 1993, which provides direction on the number and distribution of snags to retain in harvest units. Direction from this letter was used for this project.

National Fire Plan Developed in August 2000 with the intent of responding to severe wildland fires and their impacts to communities while addressing five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability. Activity and natural fuels are proposed for treatment in this project.


Analysis and documentation for this project has been done according to direction contained in the National Forest Management Act (NFMA), National Environmental Policy Act (NEPA), Council on Environmental Quality Regulations (CEQ), Clean Water Act (CWA), Clean Air Act (CAA), National Historic Preservation Act (NHPA), and Endangered Species Act (ESA).

1.8 Treaty Rights

The Forest Service, through the Secretary of Agriculture, is vested with statutory authority and responsibility for managing resources of the National Forests. Commensurate with the authority and responsibility to manage is the obligation to consult, cooperate, and coordinate with Indian Tribes in developing and planning management decisions regarding resources on National Forest system land that may affect tribal rights.

Locally, the Sunrise project area lies within the area ceded to the United States government by the Nez Perce Indians, as a result of the Treaties of 1855. Elements of respective Indian cultures, such as tribal welfare, land, and resources were entrusted to the United States government as a result of the treaties. Trust responsibilities resulting from the treaties dictate, in part, that the United States government facilitate the execution of treaty rights and traditional cultural practices of Nez Perce Indians by working with them on a government to government basis in a manner that attempts a reasonable accommodation of their needs, without compromising the legal positions of the respective tribes or the federal government. Specific treaty rights applicable
to that land base managed by the Umatilla National Forest area generally articulated in Article III of the 1855 Nez Perce Treaty, include:

“The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.”

Although the 1855 Treaties do not specifically mandate the federal government to manage habitats, there is an implied assumption that an adequate reserve of water be available for executing treaty related hunting and fishing activities. Of major concern relating to recent Forest Service projects are potential effects on Treaty rights, fish habitat and populations, water quality, and protection of archaeological sites, traditional cultural properties, and first foods resources. Because tribal trust activities often occur in common with the public, Umatilla National Forest strives to manage tribal ceded land to enable the execution of tribal rights, as far as practicable, while still providing goods and services to all people.

1.9 Tribal and Public Involvement

Tribal Involvement
The Notice of Intent (NOI) was published in the Federal Register on November 28, 2014. The NOI asked that public comment on the scoping be received by December 29, 2014. In addition, as part of the public involvement process, the agency sent letters on December 12, 2014 describing the project to representatives of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Nez Perce Tribe, and to interested individuals, organizations, and other agencies that have indicated an interest in this type of project in the recent past.

Public Involvement
Using the comments from the public, other agencies, and the CTUIR and Nez Perce Tribe (see Scoping Comments section), the interdisciplinary team developed a list of issues to address. A table of scoping input and issues identified is located in the project file at the Pomeroy District office. Any issues raised during the public scoping process were considered and analyzed in this document. The Forest Service separated the comments into two groups: issues considered and comments dismissed. Comments dismissed pertained to activities and/or effects 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence.

For this project, a government to government scoping letter was sent to tribal staff members of the Nez Perce Tribe on December 14, 2014, informing them of the Sunrise proposed project and requesting any comments or concerns regarding the project. The Pomeroy District Ranger presented the District Program of Work to Nez Perce tribal staff members on March 20, 2015 and continued to update the Nez Perce tribal staff members is subsequent opportunities. At these meetings, projects are presented the District Ranger solicits questions, comments, or requests for additional information. Several field trips were also organized with tribal staff members on June 29, 2015; December 08, 2015; and October 24, 2016 to view the project area, discuss potential treatments, answer any questions and address any concerns.
General concerns received from tribal staff members on recent projects similar to the Sunrise project include the following:

- Potential effects to archeological and traditional properties and first foods resources.
- Potential effects to water quality.
- Potential effects to fish habitat, including salmonid species federally listed as threatened or endangered under ESA.
- Potential effects to economic recovery.
- Potential effects to treaty rights.

After the government to government consultation, scoping letter and Program of Work meetings, no comments or concerns specific to the Sunrise Project were presented by tribal staff members.

1.10 Decision Framework

The scope of the project and decision to be made are limited to: commercial timber harvest, fuels treatments (landscape prescribed fire, non-commercial thinning, and non-commercial mechanical treatment), danger tree removal along haul routes, and mitigation and monitoring within the project planning area. Connected actions include reforestation of harvest units and temporary road development and decommissioning of temporary roads. Chapter 2 details the designs of these actions. Proposed project activities would occur on National Forest System lands (NFS) and the decision to implement them would be limited to NFS lands.

The responsible deciding official will decide whether to implement the proposed action, another alternative action, or take no action at this time. If an action alternative is selected, the responsible deciding official will also determine:

1. How much and where timber harvest and fuel treatments, along with their associated activities, should occur.
2. Whether other management activities (landscape prescribed fire, danger tree removal, and fuel treatments) and their associated activities should occur.
3. What monitoring requirements are needed to assure the selected alternative and mitigation are implemented as designed.

1.11 Scoping Comments

Issues Considered for Detailed Study

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to explore alternative ways to meet the purpose and need for the proposal, while reducing adverse effects and compare trade-offs for the decision maker and public to understand. The responsible official approved the issues to be analyzed in depth by the IDT in the environmental analysis, as well as issues considered, but not analyzed in depth. Issues to be analyzed in depth include potential direct, indirect, and/or cumulative effects upon the following resources or topics that were brought to light through internal and external scoping and consideration for significance of any effects:

- Forest vegetation composition, structure, and density
- Fuels: Fire Regime Condition Class
- Amount and distribution of source habitat for rocky mountain elk, pileated woodpecker, marten, and three-toed woodpecker
- Economic issues: net present value of forest products
Invasive plants
Access management: road decommissioning
Inventoried Roadless Areas
Soil resources
Water quality / hydrologic function
Recreation opportunities
Threatened, Endangered, and/or Sensitive Plants
Carbon emissions / climate change

A majority of the management area acres within the Sunrise project emphasize the management of wildlife and timber; therefore, treatments were designed to address the needs associated with one or both of these resources. Some issues identified from scoping indicated possible unresolved conflicts. Specifically, the proposed action could negatively affect management indicator species by decreasing the quality, abundance, and distribution of habitat, due to decreased cover and security areas, as well as old forest distribution, old forest connectivity, and snag habitat. Measures for this issue include:

- Amount and distribution of elk cover and open roads
- Amount, distribution, and connectivity of old forest
- Amount and distribution of source habitat for pileated woodpecker, marten, and three-toed woodpecker
- Snag and down wood: range of variation analysis

**Issues Dismissed from Detailed Study**
Following scoping, only one issue was omitted from detailed study because it did not meet the purpose and need or was outside of the scope and scale of the proposed project. Some comments addressed the possible effect of the Sunrise project on greenhouse gas emissions. This issue is addressed generally in Chapter 3, in relation to the Sunrise project area and vicinity because enough is known about the scope and scale of the Sunrise project relative to global emissions to determine that overall effects would be negligible in a global context. All other issues identified during scoping are considered in detail in this EIS.
Chapter 2. Alternatives

2.1 Introduction

Three alternatives were selected for development along with design criteria and monitoring elements associated with the alternatives. These alternatives will be described in this chapter with supporting information incorporated by reference in associated appendices. Maps showing activity areas described in action alternatives are located in Appendix A. The proposed action alternatives are limited to connected, similar, and cumulative actions (40 CFR 1508.25). Both action alternatives propose activities (prescribed landscape burning) that occur within a congressionally designated area: the Asotin Creek Inventoried Roadless Area (IRA). No tree cutting will occur within that IRA. A finding that the action alternatives are consistent with specific direction and/or provisions in the enabling legislation is discussed in Chapter 3.

2.2 Range of Alternatives

The phrase “range of alternatives” refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated as well as other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them [CFR 40.1502.14].

Both action alternatives respond to the project purpose and need to modify species composition, forest structure, fuel loading, and tree density through a combination of activities including tree cutting, mastication, tree planting, and pile, jackpot and landscape broadcast burning. Activities would occur over a 5-10 year period beginning in approximately 2019. No trees ≥21 inches in diameter at breast height (DBH) would be cut under this action alternative and no cutting would occur within PACFISH buffers. Alternative C includes the same types of activities as Alternative B, but tree-cutting and road-related activities would occur to a lesser degree.

The alternatives for this project were designed to express a range of possible actions. The Interdisciplinary team (IDT) developed the range of alternatives and design criteria presented in this chapter. The type and scope of activities were determined by the project purpose and need, Forest Plan goals and objectives, Forest Plan standards and guidelines, requirements under the Endangered Species Act, and other Federal and State laws and regulations.

The IDT recommended, and the responsible official approved, two action alternatives and a No Action alternative based on the information presented in Chapter 1. Alternative C was developed following the scoping period based on comments that identified possible effects of the proposed action on wildlife populations and habitat. A modified version of the proposed action - occurring over a smaller geographic area - was developed to reduce detrimental effects on habitat, yet still meet the project purpose and need. No other action alternatives were considered because none were proposed during scoping, and no other activities are known to modify vegetation and fuels in the manner required to meet the project purpose and need. The two action alternatives represent a range of possible extent that could reasonably be expected to alter vegetation and fuels characteristics to the degree indicated by current departures from desired conditions.
2.3 Alternatives Considered in Detail

Alternative A (No Action)

Purpose and Design
- No new management activities as proposed would occur.
- Current biological and physical processes would be allowed to continue along their present path along with associated risks and benefits and serve as a baseline for comparison with other alternatives.
- Responds to the requirement to consider a No Action alternative (40 CFR §1502.14 (d)).

Description
Under the No Action alternative, no activities identified in the proposed action would occur and previously approved ongoing activities such as domestic cattle grazing, wildfire suppression and/or containment, firewood cutting, recreation, and road maintenance (including danger tree removal) would continue. This alternative would allow timber stands, identified at this time as needing treatment, to progress through growth and successional processes at their own rate and in the absence of unsuppressed wildfires or human-caused ecological disturbances. Natural fuels would not be treated to reduce the risk of undesired wildfire intensity or allow for a safer environment for fire-fighting personnel during fire suppression. No tree cutting, tree planting, fuels treatments for natural or activity fuels, landscape prescribed fire, or road decommissioning would be implemented to accomplish project goals.

Alternative B – Proposed Action – Preferred Alternative

Purpose and Design
Alternative B responds to the project purpose and need to modify species composition, forest structure, fuel loading, and tree density through a combination of activities including tree cutting, mastication, tree planting, and pile, jackpot and landscape broadcast burning. Activities would occur over a 5-10 year period beginning in approximately 2019. No trees ≥21 inches in diameter at breast height (DBH) would be cut under this action alternative and no cutting would occur within PACFISH buffers. The extent of activities for both Alternative B and C are described further at the end of this chapter.

Alternative B is a modification of the alternative proposed during scoping, with the difference of acreages that have been adjusted to reflect additional field reviews and updated GIS information. Treatments in Alternative B respond to elements identified in the Purpose and Need (Chapter 1) and are designed to accomplish the following objectives, while complying with all applicable laws, rules, and regulations:

- Modify dry, moist, and cold upland forests to a species composition and structure compatible with the historical range of variability. Thinning treatments are used to reduce insect and disease susceptibility by improving tree and stand vigor. Regeneration treatments are used to improve upland forest sites where early-seral species are no longer present in ecologically viable amounts.
- Reduce fuel loading (surface, ladder, and canopy fuels) to a level that facilitates future reintroduction of low-intensity surface fire, reduce ladder and ground fuels in natural fuel areas to lower the risk of fire spread into the upper canopy, and reduce fuels that would contribute to uncharacteristic wildfire intensity and resource damage.
• Provide sawlogs and wood fiber products for utilization by local and regional industry.
• Continue to provide and manage wildlife habitat and its components (cover and forage).
• Reduce risk of personal injury by removing danger trees along haul routes used for timber sale activities.

Description

Vegetation Treatments

Approximately 7,790 acres would be treated with either an intermediate cut (5,660 acres) or a regeneration (2,130 acres) tree-cutting activity in an effort to improve tree species composition, reduce tree density, and/or alter stand structure (see Appendix A for maps, Appendix B for a listing of units and treatments, and the Silviculture report for detailed descriptions of silvicultural activities and terminology definitions.). Approximately 5,530 acres of the tree-cutting treatments would include the removal of sawlogs and small-diameter trees (generally less than 9 or 10 inches DBH) and/or excess down wood for use as woody biomass products. In most cases, treatments would be designed to promote underrepresented, early seral tree species such as ponderosa pine and western larch. No trees greater than or equal to 21 inches DBH would be cut under this action alternative except for danger trees felled for safety concerns. Small tree removal may include mastication or hand thinning. Additionally, no cutting would occur within the PACFISH buffers. Approximately 2,130 acres would be reforested through three planning to help restore early seral tree species. Fuels treatments would reduce activity generated and existing natural fuels on 5,520 of harvest units. These treats may include lop and scatter, broadcast and underburning, as well as burning of excess activity generated fuels.

Intermediate Cutting

Approximately 5,660 acres would be treated with an intermediate cut. These acres include some of the “small tree removal” activities described later in this section. Intermediate treatments in the Sunrise project would generally retain a forest meeting minimum stocking requirements and sufficient over-story density to preclude extensive tree germination and establishment.

For dry-forest sites, intermediate cutting would be utilized to transform some of the overrepresented Douglas-fir cover type to the underrepresented ponderosa pine cover type. For moist-forest sites, intermediate cutting would transform some of the overrepresented grand fir and spruce-fir cover types to the underrepresented western larch, broadleaved species, and/or lodgepole pine cover types. Among dry and cold forest sites, intermediate cutting would be used to transform overrepresented understory reinitiation to currently underrepresented stem exclusion, and old forest multi-strata structure classes to old forest single-strata classes. Intermediate cutting would reduce tree density (stocking) levels for high and moderate-density stands on dry, moist, and cold forest sites, thereby increasing amounts of underrepresented moderate and low-density stand types.

Within units designated for intermediate cutting, those identified as “high-retention” areas will be treated to maintain marginal or satisfactory wildlife cover and/or satisfactory cover for wildlife connectivity corridors. Approximately 2,210 unit acres have been identified for cover requirements, 1,372 (62%) of those acres will be hand-thinned and receive landscape-burning treatment only. The goal of the activities in high-retention units is to maintain marginal or satisfactory elk cover and/or wildlife habitat connectivity.

Treatments in high-retention units would include small-tree thinning of trees 10 inch DBH or less, pruning, and treatment of surface fuels. Tree-felling would generally be limited to sub-
dominant or suppressed trees, surface fuels, or ladder fuels (small live or dead trees immediately adjacent to larger, older trees). Prescribed fire would also be implemented within high-retention units with higher canopy cover following the removal of trees. The desired prescribed fire effects include low overall burn severity within these units (generally less than 10% canopy reduction from fire-caused tree mortality), consumption of surface and lower-canopy fuels, promotion of sprouting hardwood vegetation, improvement of grass community vigor and density, and minimization of tree mortality caused by ladder fuel ignition. Duff pull-back from identified large old residual trees and landscape burning would be conducted in such a manner as to minimize the possibility of large, old pine mortality caused by smoldering duff consumption, following guidance provided in (Hood 2010, Progar et al. 2017).

**Regeneration Cutting**

Approximately 2,130 acres would be treated with a regeneration cut. These acres include some of the “small tree removal” activities described later in this section. Regeneration cutting is defined as tree removal to assist regeneration already present (e.g. existing seedling and saplings), or to make new regeneration possible (Helms 1998). The Silviculture report contains general descriptions of silvicultural activities and terminology definitions. Regeneration cutting is proposed for upland-forest sites where early seral species (ponderosa pine, western larch, lodgepole pine) are no longer present in ecologically viable amounts. These stands are more advanced in ecological succession, and often exhibit high levels of insect or disease mortality. The existing stocking of mid or late seral species—primarily Engelmann spruce, subalpine fir, grand fir or Douglas-fir—typically exceeds that of the early seral species. Many stands within the dry, moist, and cold upland forest sites have become dominated by shade-tolerant, late seral, fire-susceptible trees species such as grand fir, Engelmann spruce, subalpine fir, and Douglas-fir.

For dry-forest sites, regeneration cutting would transform some of the overrepresented Douglas-fir forest cover types to the underrepresented ponderosa pine cover type. For moist-forest sites, regeneration cutting would transform some of the overrepresented Douglas-fir forest cover type to the underrepresented western larch or lodgepole pine cover types. Regeneration cutting would convert some of the overrepresented subalpine fir and spruce cover types to underrepresented lodgepole pine cover types, as well as western larch, which is currently at the low end of the desired range.

Regeneration cutting would convert some of the overrepresented stem exclusion or understory reinitiation structure classes to the underrepresented stand initiation structure classes, which would occur in dry, moist, and cold upland forests under this action alternative. It can also be used concurrently to move stands with moderate or high tree densities to low or moderate tree densities.

For the Sunrise project, regeneration cutting would include individual-tree selection, group selection, shelterwood harvest, seed-tree harvest, or clearcutting methods. Depending on site and stand characteristics, regeneration cutting methods may result in the removal and/or retention of a variety of tree sizes, species, and density levels; the common element is that substantial amounts of tree germination and establishment are expected following the activity. In some cases, regeneration cutting methods such as individual-tree or group selection would retain stand of moderate density overall, but with enough gaps and openings to allow germination and establishment of a new tree cohort. The amount of retained overstory was predicted in the environmental analysis based on existing stand characteristics and anticipated cutting methods.
**Tree Planting within Regeneration Units**

Approximately 2,130 acres are proposed for reforestation through tree planting. Tree planting is defined as “the establishment of trees by planting seedlings, transplants, or cuttings” (Dunster and Dunster 1996). Planting is proposed to improve tree composition for currently understocked stands, or to help provide desired (future) forest conditions in openings created by the regeneration cutting.

The planting proposed action responds to one of the upland forest issues identified in the purpose and need in Chapter 1. Planting would help restore early seral tree species (ponderosa pine, and western larch) and shrubs for both dry- and moist-forest sites. An emphasis on early seral species was included in the forest-wide standards and guidelines section of the Forest Plan (item C on page 4-73 in the Plan: “strong consideration should be given to maintenance of stands dominated by early successional species”), as well as the purpose and need section of this document.

Created openings resulting from Sunrise regeneration cutting, particularly those where natural regeneration might not be sufficient to meet requirements established by the National Forest Management Act of 1976 and its regulations (NFMA; 16 U.S. C. 1604), would be planted with tree seedlings to reestablish an ecologically appropriate mix of early seral tree species, and to ensure that minimum stocking objectives from the Forest Plan are met within 5 years of final harvest, as required by 16 U.S.C. 1604 (E) (ii).

Although not required by NFMA, native shrub seedlings would also be planted when doing so would help meet the desired future conditions of an area. Planting helps restore shrub populations that have been reduced or lost altogether due to intense ungulate herbivory (Riggs et al. 2000), or because of overstory shading caused by uncharacteristically high tree density (Hedrick et al. 1968).

Tree planting in regeneration units would meet the following minimum tree stocking guides listed in Table 2-1.

<table>
<thead>
<tr>
<th>Average Stand Diameter After Harvest (Inches DBH)</th>
<th>Minimum Acceptable Stocking (Live Trees Per Acre)</th>
<th>Minimum Basal Area Stocking (Basal Area Per Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5&quot;</td>
<td>100-200</td>
<td>14 - 27</td>
</tr>
<tr>
<td>6&quot;</td>
<td>100</td>
<td>20</td>
</tr>
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<td>8&quot;</td>
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<tr>
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</tr>
</tbody>
</table>

**Logging Systems**

Timber harvest methods would include conventional ground-based logging (approximately 3,310 acres) and skyline logging (approximately 2,210 acres). For all cutting units in which a
commercial product is removed, yarding systems could require either whole-tree yarding\(^{12}\) or leaving tops attached\(^{13}\) with de-limbing in the woods and leaving the activity slash. Conventional ground-based harvesting utilizes a crawler tractor or rubber-tired skidder that would operate on designated trails with selected spacing criteria. All equipment would be required to remain on designated skid trails. Skyline logging would occur in areas where topography is suitable and necessary for this type of logging. In a skyline system, logs would be felled and yarded up the hill partially or fully suspended by a system of cables to reduce soil disturbance and improve economic efficiency. Skyline systems utilize only hand-felling of trees, while conventional ground-based systems may utilize a tracked caterpillar feller-buncher, or hand-felling. Harvest units with a chip/biomass component may utilize a chipper/grinder at the landing to process and load material to chip trucks for delivery to production facilities.

**Fuels Treatments**

Fuel treatments are proposed to reduce activity generated fuels and existing natural fuels in the 5,520 acres of harvest units. They are also designed to modify ladder and surface fuels outside of harvest units to lower the risk of fire spreading into the upper tree canopy, and in areas where fuels would contribute to undesired/uncharacteristic wildfire intensity and resource damage. Fuel treatments include the following activities, alone or in combination.

- **Whole Tree Yarding:** The entire tree above the stump including non-merchantable material (tops and limbs) will be yarded to the landing. Once at the landing this material that doesn’t meet merchantable specifications may be utilized for woody biomass products or burned.

- **Lop and Scatter:** In areas where non-merchantable tops and limbs would be left, boles would be cut to less than six feet in length and limbs would be severed from bole and scattered to prevent fuel bed depth from exceeding two feet in depth.

- **Jackpot burning:** Burning of slash concentrations would be utilized to reduce excess slash generated in harvest units. Jackpot burning would be accomplished utilizing hand ignition methods. Harvest units located in landscape prescribed fire areas may require jackpot burning prior to landscape prescribed fire to reduce heavy slash concentrations.

- **Broadcast and Under Burning:** Low intensity prescribed fire would be applied to a broad area using hand ignition devices. This method would be used to favor early seral, fire resistant species composition and structure while reducing surface and ladder fuels. Under burning would be used to reduce activity and natural fuels in harvest units to reduce activity slash and create regeneration/planting spots.

- **Grapple Piling:** Slash generated by timber harvest will be mechanically piled in units where prescribed fire would not be effective to reduce activity slash or to create planting spots for regeneration. Both naturally occurring woody debris and activity generated fuels may be piled. Chainsaws may be used to compact material in the pile and throughout the unit to cut logs in lengths that are more easily piled. Pile size would vary and will be burned.

- **Landing Pile Burning:** Hand ignition of landing and grapple piles would occur when the threat of fire spreading from the pile location would be minimal. Pile specifications would ensure that pile burning would have minimal damage to residual trees in the stand. Large

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\(^{12}\) Whole-tree yarding – Tops (with limbs) will be left attached to the last log and yarded to the landing, where piled and burned.

\(^{13}\) Leave tops attached: a contract provision requiring that felled trees meeting minimum merchantability specifications are limbed to the minimum top diameter inside bark, bucked according to length, with the final log yarded with the unlimbed tree top attached, and which is processed at the landing.
landings piles that could create areas of bare soil would be replanted to native grasses.

**Small Tree Removal**

Small tree removal activities are included as part of the intermediate and regeneration cutting activities described earlier in this section. Small tree removal would be used to remove understory trees in an effort to reduce ladder fuels, decrease stand density, and potentially provide woody biomass products for local industry. Removal of ladder fuels would increase canopy base height and deter the initiation of a crown fire within the treated stand. Increased spacing of trees (reduced canopy bulk density) would result in bringing a crown fire that was initiated outside the stand back to the ground. Fire tolerant species (ponderosa pine, western larch, and Douglas-fir) would be favored as leave trees where they occur.

In dry forest stands where under burning would follow harvest, it may be necessary to treat the <10 inch material prior to burning so that it does not function as ladder fuel. Stands that are mechanically thinned would have an increased fire hazard until the resulting fuels abated either naturally or with prescribed fire. The needles and smaller branches would fall from severed stems after the first 2 to 3 years. Snow pack would help compact smaller fuels, resulting in lower fire potential. Methods used for small tree removal are:

- **Mechanical Thinning (Mastication):** Consists of the cutting and mulching of trees 10 inches or less DBH. This treatment would be comparable to the intermediate cutting described above, except that trees and/or shrubs would be cut and mulched on-site as opposed to being removed for a commercial product.
- **Manual (hand) Thinning:** This activity would cut trees measuring less than 10 inches DBH that are in excess to full stocking. Undesired trees and fuels would be slashed by hand and scattered. Slash would be treated so that the resulting height of surface fuels is no greater than two feet in depth. Fire-tolerant species (ponderosa pine, western larch, and Douglas fir) would be favored as leave trees where they occur. This activity may include the transfer of activity fuels from the base of residual and or reserve trees, and removal of ladder fuels from residual and or reserve trees. This may occur in landscape prescribed fire activity units, if needed, to reduce mortality to residual and or reserve trees.

**Landscape Prescribed Fire**

Landscape prescribed fire would occur across approximately 14,055 acres within Sunrise planning area. This treatment would reintroduce fire within the project area’s low severity and mixed severity (Fire Regime I and III) fire-dependent ecosystems, treating about 60 percent of the prescribed fire area to lessen the impact of a future uncharacteristic wildfire and improve forage quality for big game, by reducing surface and ladder fuels, and duff accumulations, and enhancing fire-tolerant trees species. Fire intensities would be kept low by establishing backing fires to minimize fire in the canopy, and burning mainly surface and ladder fuels throughout the majority of the prescribed fire area. Individual tree and group torching would likely occur in areas where there are sufficient ladder fuels, and in timber stands where there are high occurrences of mistletoe infected trees.

All landscape prescribed fire areas are accessible by forest roads, but due to the steep terrain and natural fuel breaks, such as ridges and rock outcroppings, handline will be utilized along

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14 Landscape prescribed burning proposed in fire regime 4 is only because of its adjacency to fire regime 1 and 3 prescribed fire areas and is being included for holding purposes. The intent is to reintroduce and/or perpetuate fire in fire regime 1 and 3 which historically experienced low to mixed severity fire and 5 to 100 year fire return intervals.
landscape prescribed fire area perimeters. The 14,055 acres proposed for prescribed burning are divided into four landscape prescribed fire areas (see Appendix A). These four areas would be divided further into burn blocks and may take multiple prescribed fire entries over multiple years to complete. Hand fireline and blackline will be utilized along burn area and burn block perimeters to control or stop the progression of fire. Blacklining methods would be completed by hand (manual methods) and in some areas by aerial ignition methods. Aerial and hand ignition would be utilized to ignite and establish backing fires in prescribed fire areas and burn block interiors.

**Danger Tree Removal**

A danger tree is defined as any standing tree that presents hazard to people due to conditions such, as but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction or lean of the tree (FSH 6709.11). Along roadways, danger trees would be evaluated in accordance with the *Field Guide for Danger Tree Identification and Response*, Pacific Northwest Region, 2008. Hazard trees around trailheads would be evaluated in the context of *Long Range Planning for Developed Sites in the Pacific Northwest: The Context of Hazard Tree Management, Pacific Northwest Region*, 1992. A tree’s potential failure zone is the area that could be reached by any part of a failed tree. This is generally one and one-half tree lengths, but can vary depending on slope, tree height, lean, individual tree characteristics, and other factors.

Danger trees would be felled and removed along all haul routes used for timber sale activity and around trailheads. Only danger trees with an imminent failure potential would be felled on closed system roads. Trees with an imminent failure potential and those deemed likely to fail within a 5-10 year period would be felled along open system roads except for sections of Forest Roads (FRs) 4400, 4300, and 4304 that separate Asotin Creek and Wenatchee Creek Inventoried Roadless Areas (IRAs) from the project planning area. Only danger trees with an imminent failure potential will be removed from these sections of road that are adjacent to the IRAs. (See Danger Trees in Glossary for definitions of imminent failure and likely to fail). Danger tree removal, for public safety, is part of Forest Service general road maintenance for these roads. Danger tree removal is currently occurring where needed on these roads, and danger trees will continue to be removed from 300 feet on each side of Forest Roads 4400, 4300, and 4304 as long as they remain open for public use. If considered economically feasible, danger trees would be sold as part of a timber sale. Danger trees within Riparian Habitat Conservation Areas (RHCAs) would be felled and left to provide additional coarse woody debris.

**Road Management**

To accomplish implementation of proposed harvest activities approximately 52 miles of seasonal open system roads (operational maintenance level 2[^15] and 3[^16]) and about 37 miles of closed system roads (operational maintenance level 1[^17]), would be used as haul routes on NFS lands. Closed system roads used for project activities would not be opened to the public during project activities. All system roads would remain the same after project implementation; closed roads would continue to be closed, and open roads would continue with preexisting designations. Approximately 14 miles of temporary roads would be constructed, of which 8 miles would be constructed over previous road templates. All temporary roads would be decommissioned after

[^15]: Operational maintenance level 2 – The operational objective is for high clearance vehicles.
[^16]: Operational maintenance level 3 – The operational objective is for passenger vehicles – road surface is not smooth.
[^17]: Operational maintenance level 1 – The operational objective is closed more than 1 year.
project activity use. No new system road construction is proposed. Detailed maps of the proposed activities are included in Appendix A. Road information is summarized by alternative in the Recreation section in Chapter 3 of this EIS.

Two existing rock sources would be used during project activities. One rock sources is located in T9N, R42E, S32, and the other in T7N, R44E S5, just north of the junction of FR 4304 and FR 4305. Three water sources would be utilized; first source in T8N, R42E, S4, second source on FR 4302 in T8N, R43E, S28, and third source located at one of the named rock sources, is located in T9N., R42E., S32. All water sources would require a moderate amount of development to permit water use for road maintenance. Any Alternate rock sources used would not require expansion, but would be within an existing rock source.

**Alternative C**

Alternative C was developed to more effectively respond to the key issue of wildlife habitat. This was due to the potential for negative effects on elk distribution and habitat quality due to decrease cover and security areas. This Alternative would also respond to the issues of old forest distribution, old forest connectivity, and snag habitat.

The types of treatment activities within Alternative C are the same as Alternative B. Alternative C, however, proposes fewer harvest acres and therefore, fewer roads would be needed to access these acres. There would be 940 acres of regeneration cutting activities, and 3,880 acres of intermediate cutting activities. The 940 acres of regeneration cutting would be replanted. Harvest would occur 2,550 acres (1,640 acres ground-based and 910 acres skyline). The same fuels treatment as Alternative B will be used on the smaller 2,550 acres of harvest. There would be 3 fewer miles of temporary roads. Activity within the winter range are the same as Alternative B, including small diameter tree cutting, fuels treatments and tree planning.

Landscape burning would occur over the same number of acres as Alternative B.

In response scoping issues and management direction to provide greater elk security within the project area, a change in closure date for road 4000-360 is proposed in order to enhance the elk security area. The closing date of this road would change from October 11 to August 1. The road would be open to motor vehicles April 1 to July 31. The first mile of the road will remain open year-round.

Activity acres, miles, or board-feet for each action alternative for the Sunrise project are shown in Table 2-2.
Table 2-2. Activity acres, miles, or board-feet for each management alternative for the Sunrise project. Alternative A is the No-Action Alternative.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree-cutting activities (Acres)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate cutting methods – thinning (free or low thin) and improvement cutting (Both alternatives include 2,210 acres of units with a high-retention prescription)</td>
<td>0</td>
<td>5,660</td>
<td>3,880</td>
</tr>
<tr>
<td>Regeneration cutting – individual-tree selection, group selection, shelterwood or seed-tree, or clearcutting methods</td>
<td>0</td>
<td>2,130</td>
<td>940</td>
</tr>
<tr>
<td>Tree-Planting</td>
<td>0</td>
<td>2,130</td>
<td>940</td>
</tr>
<tr>
<td><strong>Economics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting areas of likely positive appraised value (acres)</td>
<td>0</td>
<td>5,520</td>
<td>2,550</td>
</tr>
<tr>
<td>Cutting areas of marginal or negative appraised value (acres)</td>
<td>0</td>
<td>2,270</td>
<td>2,270</td>
</tr>
<tr>
<td>Commercial timber volume (thousand board-feet / MBF)</td>
<td>0</td>
<td>26,500</td>
<td>12,100</td>
</tr>
<tr>
<td><strong>Cutting/harvest Systems (Acres)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand-felling, lop/scatter slash</td>
<td>0</td>
<td>2,270</td>
<td>2,270</td>
</tr>
<tr>
<td>Conventional ground-based (tractor or skidder)</td>
<td>0</td>
<td>3,310</td>
<td>1,640</td>
</tr>
<tr>
<td>Skyline</td>
<td>0</td>
<td>2,210</td>
<td>910</td>
</tr>
<tr>
<td><strong>Fuels Treatments (Acres)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole-tree yarding/ landing-pile burning</td>
<td>0</td>
<td>5,520</td>
<td>2,550</td>
</tr>
<tr>
<td>Mechanical grapple-piling and burning</td>
<td>0</td>
<td>1070</td>
<td>330</td>
</tr>
<tr>
<td>Manual (hand) thinning / lop and scatter</td>
<td>0</td>
<td>1,680</td>
<td>1,150</td>
</tr>
<tr>
<td>Mechanical thinning (slash-buster/mastication)</td>
<td>0</td>
<td>590</td>
<td>590</td>
</tr>
<tr>
<td>Broadcast/jackpot burning of activity fuels</td>
<td>0</td>
<td>880</td>
<td>600</td>
</tr>
<tr>
<td>Landscape prescribed burning</td>
<td>0</td>
<td>14,055</td>
<td>14,055</td>
</tr>
<tr>
<td><strong>Transportation and Access (Miles)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gated closed roads opened for haul or project vehicle access, then reclosed</td>
<td>0</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>Temporary roads constructed on new template (prism) and post-harvest decommissioning</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Temporary roads constructed on existing template (prism) and post-harvest decommissioning</td>
<td>0</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>4100-300 road closure changed to August 1 to March 31</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

Note: Acres values are approximate and rounded to nearest 10 acres. Mile values are approximate and rounded to the nearest 1 mile. Intermediate cutting methods acres listed under Tree-Cutting Activities includes thinning and/or burning activities also listed under Fuels Treatments. Fuels treatments may occur alone or in combination.
### 2.4 Project Design Criteria

Management requirements are established to protect natural resources and the quality of the human environment, and include standards and practices incorporated into planned activities. The project design criteria (PDCs) listed in the following table include standards and/or practices that the IDT developed during project planning and analysis to address site-specific environmental and resource concerns not sufficiently addressed by existing management requirements. PDC’s are specific actions designed to address site-specific environmental or resource concerns that were not sufficiently addressed by existing management requirements. PDC’s occur during or after project implementation and can include avoiding the effect, minimizing the effect by limiting the action, rectifying the effect, reducing the effect through maintenance, or compensating for the effect. Additionally, Best Management Practices (BMP’s) are a standard set of general guidelines used throughout the Forest Service that are primarily intended to provide protections for water and aquatic resources. For purposes of clarity and simplicity, BMPs have been added to PDCs in a single table (Table 2-3). The project design criteria and BMPs apply to all action alternatives.

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RHCA-1</strong></td>
<td>Stream and riparian protection is based on the Forest Plan as amended by PACFISH. PACFISH standards and guidelines related to timber harvest, roads, and fire apply to this project and are incorporated by reference into this document. No harvest, landings, noncommercial thinning or slash piling will take place in RHCA's which are described below as they apply to this project.</td>
</tr>
<tr>
<td><strong>Category 1 - Fish-bearing streams:</strong> RHCA's consist of the stream and the area on either side of the stream extending 300 feet slope distance from the edges of the active stream channel.</td>
<td></td>
</tr>
<tr>
<td><strong>Category 2 - Perennial non-fish-bearing streams:</strong> RHCA's consist of the stream and the area on either side of the stream extending 150 feet slope distance from the edges of the active stream channel.</td>
<td></td>
</tr>
<tr>
<td><strong>Category 3 - Ponds, lakes, reservoirs, and wetlands greater than 1 acre:</strong> RHCA's consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or the extent of the seasonally saturated soil, 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.</td>
<td></td>
</tr>
<tr>
<td><strong>Category 4 - Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas:</strong> This category includes criteria with high variability in size and site-specific characteristics. At a minimum the RHCA's must include: the area from the edges of the stream channel, wetland, landslide, or land-slide prone area to a distance equal to 100 feet.</td>
<td></td>
</tr>
<tr>
<td><strong>RHCA-2</strong></td>
<td>Trees may be felled in RHCA's when they pose a safety risk. If possible, keep all trees on site to meet woody material objectives.</td>
</tr>
<tr>
<td><strong>RHCA-3</strong></td>
<td>Prescribed Fire will not be ignited in RHCA's but will be allowed to back into RHCA's (see Protection of fish habitat for additional guidelines).</td>
</tr>
<tr>
<td><strong>WQ-1</strong></td>
<td>Implement and monitor Best Management Practices (BMPs) and incorporate findings into project implementation (See Appendix C for a listing of BMPs selected for project implementation along with effectiveness rating).</td>
</tr>
<tr>
<td><strong>WQ-2</strong></td>
<td>Ground based equipment will only cross ephemeral draws and channels at sites pre-approved by the responsible Forest official, and crossings will be minimized. Harvest systems will be designed to minimize crossing ephemeral draws. Ephemeral draws will not be crossed where equipment will cause bank breakdown. Woody debris or rock may be placed into crossings to reduce soil disturbance and compaction. All embedded wood will be retained. Other wood will be retained as specified in project design criteria for Wildlife.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>WQ-3</td>
<td>Ephemeral stream channels will not be used as forwarder trails, landing sites, or as road locations.</td>
</tr>
<tr>
<td>WQ-4</td>
<td>As referenced under timber sale contract standard provisions B(T)6.5 &quot;Stream course Protection and B(T)6.6 &quot;Erosion Prevention and Control&quot;, commercial use of National Forest roads shall be suspended when commercial contract or permit operations create movement of sediment laden water from the road surface in areas where it could flow into stream channels. This may be from pumping of saturated fines by passage of commercial or contract vehicles, creating sediment laden water on the road surface during rain or snowmelt periods.</td>
</tr>
<tr>
<td>WQ-5</td>
<td>Timber sale purchaser will prepare a spill containment plan that will ensure that spilled fuel will not leave the site. Fuel will not be stored within any RHCA. Refueling, repair, and maintenance of equipment will be done at landings or on forest roads outside of RHCAs.</td>
</tr>
<tr>
<td>WQ-6</td>
<td>Where the proposed haul routes encounter wet areas, new drainage structures and surface rock will be installed.</td>
</tr>
<tr>
<td>WQ-7</td>
<td>Proposed temporary roads will have drainage installed if retained over-winter. Upon completion of project activity, roads will be obliterated using criteria in WQ-9. Berms will be pulled into the roadbed and re-contoured, and the road will be revegetated with native seed and mulched with existing slash. Road entrances may be camouflaged to discourage use.</td>
</tr>
<tr>
<td>WQ-8</td>
<td>Installation and removal of culverts on Forest Road 4027016 would be bedded on native material, placed on natural stream grades and occur under dry conditions; slopes would be pulled back to a stable angle and soils stabilized as described in WQ-9.</td>
</tr>
</tbody>
</table>
| WQ-9            | The following design criteria will be used for road obliteration/decommissioning:  
|                 | a) Where decommissioning crosses draws or channels, work will be done when channels are dry.  
|                 | b) Draws will be contoured to match upstream and downstream channel features including:  
|                 | gradient, bankfull width and channel cross-section, and floodplain.  
|                 | c) Re-contoured draws will be seeded with local, weed free native seed and mulched with on-site material or weed free straw or hay.  
|                 | d) Roadbeds will be de-compacted and drained as necessary to prevent erosion.  
|                 | e) Where full re-contour does not occur, remaining fill will be stabilized.  
<p>|                 | f) Where re-contouring occurs reconnect the surface of the cut bank slope with the re-contoured fill slope |
| Objective: Protection of Fish Habitat |
| FISH-1          | When drafting water, sources will be monitored for reduced flows. During low flow (less than 5 cfs) conditions, spring-fed ponds will be used as sources prior to the use of stream sources whenever feasible. If spring-fed ponds are not feasible, stream sources can be used but pumping rates must not reduce flows to less than 5 cfs. If the stream has less than 10 cfs, stream flow cannot be reduced more than 1/10th of the existing stream flow and will discontinue drafting if this amount is exceeded. |
| FISH-2          | During road maintenance and snow plowing side casting of materials will not occur where these materials could be directly or indirectly introduced into a stream, or where the placement of these materials could contribute to the destabilization of the slope. |
| FISH-3          | Slough and waste materials removed during road maintenance activities, including ditch and culvert cleaning, will be deposited in approved disposal areas outside of RHCAs. For erosion control and stabilization the disposal site will be seeded with native species. |
| FISH-4          | Ditches will only be maintained where the water captured by the ditch is not able to be transported to the adjacent drainage structure that carries the water across the road. |
| FISH-5          | Prescribed fire will not be ignited within 600 feet of fish bearing streams in the North Fork Asotin Creek subwatershed to maintain overstory shade in RHCAs. |</p>
<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOIL-1</strong></td>
<td>Retain as much duff as possible, while meeting fuel reduction objectives to control erosion and provide organic matter.</td>
</tr>
<tr>
<td><strong>SOIL-2</strong></td>
<td>For jackpot or underburning, soil exposure will be limited to 20 percent or less of the area on slopes greater than 35%.</td>
</tr>
<tr>
<td><strong>SOIL-3</strong></td>
<td>Within RHCA mechanical fuels treatment areas soil exposure will be limited to 10 percent or less.</td>
</tr>
<tr>
<td><strong>SOIL-4</strong></td>
<td>Fireline construction will only occur where necessary. Any fireline constructed will be to minimal standard needed to complete prescribed burning. Locations will be evaluated post-harvest. Water bars will be installed along fireline and all firelines will be seeded after project completion, as needed.</td>
</tr>
<tr>
<td><strong>SOIL-5</strong></td>
<td>All logging systems will provide at least one-end suspension.</td>
</tr>
<tr>
<td><strong>SOIL-6</strong></td>
<td>Yarding will be spaced for optimum efficiency and minimum soil disturbance. Forwarder trails will average 50 feet apart, except where converging. Conventional system trail spacing will average 100 feet. Skyline system corridors will average 100 feet apart. All trails will be approved prior to use.</td>
</tr>
<tr>
<td><strong>SOIL-7</strong></td>
<td>Use existing trail system as much as possible. Ground based equipment will operate when soil conditions are dry enough to support machinery adequately.</td>
</tr>
<tr>
<td><strong>SOIL-8</strong></td>
<td>No ground-based equipment will operate on sustained slopes greater than 35% in order to reduce the potential for soil movement.</td>
</tr>
<tr>
<td><strong>SOIL-9</strong></td>
<td>Minimize exposure of soils and keep erosion control current.</td>
</tr>
<tr>
<td><strong>SOIL-10</strong></td>
<td>Landings will be designed and constructed to minimize size and provide for safe operations.</td>
</tr>
<tr>
<td><strong>SOIL-11</strong></td>
<td>Erosion control measures will occur on all skid trails and landings, as specified under timber sale contract provisions B (T) 6.67 and C (T) 6.6#. Seed soil exposed by contract operations using native seed. Subsoil, waterbar, and mulch using existing slash as necessary to prevent erosion.</td>
</tr>
<tr>
<td><strong>SOIL-12</strong></td>
<td>Temporary roads (Alternatives B and D) - install drainage if roads remain over-winter and will be decommissioned following use.</td>
</tr>
<tr>
<td><strong>SOIL-13</strong></td>
<td>If using mechanical treatment methods utilize low ground pressure equipment and existing skid trails wherever possible.</td>
</tr>
<tr>
<td><strong>SOIL-14</strong></td>
<td>Avoid ground equipment operations (including ATV and truck driving and parking) on unstable, wet or easily compacted soils and steep slopes as described per Umatilla Forest Plan.</td>
</tr>
<tr>
<td><strong>SOIL-15</strong></td>
<td>Retain sufficient slash/biomass material to provide organic matter and nutrients commensurate with existing technical recommendations.</td>
</tr>
<tr>
<td><strong>INPLT-1</strong></td>
<td>Invasive plant sites will be treated consistent with the 2005 Region 6 Invasive Plant FEIS and ROD that amended the Umatilla Forest Plan in March, 2006, and the July 2010 Umatilla National Forest Invasive Plant Treatment Project FEIS and ROD.</td>
</tr>
<tr>
<td><strong>INPLT-2</strong></td>
<td>All gravel, fill, sand stockpiles, quarry sites, and borrow material will be inspected for the presence of invasive plants before use and transport. Use only gravel, fill, sand, and rock that are judged to be weed seed free by District or Forest weed specialist.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>INPLT-3</td>
<td>Road blading, brushing, and ditch cleaning in areas with high concentrations of invasive plants will be conducted in consultation with District or Forest-level invasive plant specialists.</td>
</tr>
<tr>
<td>INPLT-4</td>
<td>Invasive plant treatment and prevention practices will be incorporated as appropriate.</td>
</tr>
<tr>
<td>INPLT-5</td>
<td>Project or contract maps will show currently inventoried high priority noxious weed infestations as a means of aiding in avoidance and/or monitoring.</td>
</tr>
<tr>
<td>INPLT-6</td>
<td>Prior to moving onto the Forest, reasonable measures will be taken to insure that all off-road equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. In addition, prior to moving off-road equipment from a cutting unit known to be infested with invasive species to any other unit that is believed to be free of noxious weeds, reasonable measures will again be taken to make sure equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds (timber sale contract provision B/BT 6.35 or equivalent provision).</td>
</tr>
<tr>
<td>INPLT-7</td>
<td>Use state certified weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If state certified straw and/or mulch is not available, individual forests should require sources certified to be weed-free using the North American Weed Free Forage Program standards, or a similar certification process.</td>
</tr>
<tr>
<td>INPLT-8</td>
<td>Soils disturbed by project activities will be revegetated with certified weed-free native seed.</td>
</tr>
<tr>
<td>INPLT-9</td>
<td>Logging system design will consider the objectives of maintaining ground cover and minimizing ground disturbance. Forest Plan standards and guidelines for ground and soil disturbance will be followed.</td>
</tr>
<tr>
<td>INPLT-10</td>
<td>Landings and parking areas will be located outside known areas of invasive plants. If no other location is feasible the site will be surveyed and treated for noxious weeds prior to use.</td>
</tr>
<tr>
<td>AIR-1</td>
<td>Washington State Smoke Management Plan regulations will be followed to protect air quality, avoid smoke intrusion into sensitive areas, and be consistent with the Clean Air Act.</td>
</tr>
<tr>
<td>ARCH-1</td>
<td>Historic properties will either be avoided by all project activities (this includes access to treatment areas and landing sites) or by site-specific mitigation measures approved by the assistant Forest Archeologist and SHPO.</td>
</tr>
<tr>
<td>ARCH-2</td>
<td>Since some project activities will be implemented over multiple years, project leaders will contact the North Zone Archaeologist prior to project implementation for monitoring and avoidance purposes.</td>
</tr>
<tr>
<td>BOT-1</td>
<td>Populations of Federally listed and Forest Service designated sensitive plant species that are in, or near, areas with proposed ground disturbing activities shall be designated as “Special Management Areas” (SMAs). These sites shall be buffered and protected from all ground disturbances. Vehicle and equipment parking, log decking, yarding, slash piling and burning, and construction of fire lines shall be prohibited within these areas. SMAs shall be clearly marked on sale maps, and on implementation planning maps. SMAs may be flagged on the ground prior to treatment. A botanist may assist with unit layout in areas where the SMAs occur. Aerial, hand, or vehicle-based fire ignition in areas with populations of sensitive plants may be done in consultation with a botanist. This would depend upon the particular species expected response to fire. Any additional populations of Federally listed and FS sensitive plants discovered during field surveys shall be evaluated for the need to be designated as SMAs. Timber sale administrator and/or implementing staff shall notify botany staff when activities are scheduled to begin in areas where SMAs are designated.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>BOT-2</td>
<td>Pre-implementation monitoring of selected high probability habitats for Federally listed and Forest Service designated sensitive plants shall be conducted in specific areas of proposed activities. These shall be determined based upon potential habitat and the potential risk to rare plants due to the proposed activities.</td>
</tr>
<tr>
<td>BOT-3</td>
<td>All documented, and any newly discovered, populations of Spalding’s catchfly shall be excluded from all burning activities. Routes for motorized off road access in Spalding’s catchfly habitat shall be preapproved by qualified botany personnel. All proposed fire-lines in Spalding’s catchfly habitat shall be field surveyed and approved by qualified botany personnel.</td>
</tr>
<tr>
<td>BOT-4</td>
<td>Protect unique habitats: lithosols (scablands), seeps, springs, wallows, and wetland areas (including wet meadows) from harvest activities. Buffer riparian and wetland areas in accordance with PACFISH buffers. Log decking, piling, and burning of slash piles shall not occur in these areas. If caves, cliff faces, or other unique habitats not listed above are encountered during recon or layout, their value to wildlife and botany would be evaluated, and appropriate protection, as determined by the District Wildlife Biologist and botanist, would be provided.</td>
</tr>
<tr>
<td>Objective:</td>
<td></td>
</tr>
<tr>
<td>FUELS</td>
<td>Slash will not be piled against large trees or snags to prevent loss from prescribed fire.</td>
</tr>
<tr>
<td>FUELS</td>
<td>Where open, park-like conditions occurred historically (pre-settlement areas characterized by frequent, low-severity fire regimes), maintain such conditions by implementing intermediate treatments and/or emphasize the removal of fire-intolerant species.</td>
</tr>
<tr>
<td>VEG-1</td>
<td>Maintain all live trees ≥ 21” dbh that currently exist within stands proposed for harvest activities.</td>
</tr>
<tr>
<td>VEG-2</td>
<td>All prescriptions in existing old forest will emphasize the retention of individual trees and tree species sufficient to maintain or attain minimum requirements for old forest, as described in the Forest Plan.</td>
</tr>
<tr>
<td>VEG-3</td>
<td>In stands that do not meet current late and old structural conditions, manipulate vegetative structure in such a manner that moves it towards those conditions, as appropriate to meet HRV within the applicable biophysical environment of the forest vegetation affected environment.</td>
</tr>
<tr>
<td>VEG-4</td>
<td>For even-aged stands on lands identified as suited for timber production and where timber production is the primary purpose for the harvest, do not prescribe regeneration activities unless stand-level growth has reached the culmination of mean annual increment.</td>
</tr>
<tr>
<td>WILD</td>
<td>Prescriptions for habitat connectivity corridors must ensure the retention of some amount of understory (if any occurs) left in patches or scattered to assist in supporting stand density and cover.</td>
</tr>
<tr>
<td>WILD</td>
<td>Leave all hollow or partially hollow, broken-top snags greater than 15 inches DBH to provide roost habitat for bats. Dead grand fir most commonly provides hollow tree habitat.</td>
</tr>
<tr>
<td>WILD</td>
<td>Protect goshawk nests from disturbance if any are located during project activities. Defer harvest on 30 acres of the most suitable nesting habitat around nest sites. Retain late and old structure forest in a 400-acre post-fledging area (PFA) as determined by the District wildlife biologist. Defer activities in active PFAs from April through August.</td>
</tr>
<tr>
<td>WILD</td>
<td>Seeps, springs, bogs, wallows, and other wet areas will be evaluated and protection measures determined by the District wildlife biologist (Forest Plan pages 4-57, 4-160).</td>
</tr>
<tr>
<td>WILD</td>
<td>If cliffs, talus or cave habitat is found, protection measures will be determined by the District wildlife biologist. (Forest Plan pages 4-57)</td>
</tr>
</tbody>
</table>
Sunrise Vegetation and Fuels Project

Design Criteria Description

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Ponderosa pine</th>
<th>Mixed conifer</th>
<th>Grand fir</th>
<th>Lodgepole pine</th>
<th>Subalpine zone</th>
</tr>
</thead>
</table>
| WILD Retain all snags 20 inches DBH and larger, except for hazard trees. If there are less than 3 large snags per acre available, smaller snags will be retained to meet 3 per acre. Maintain down wood habitat and green replacement trees at or beyond levels identified below. Tree species and soundness at the base will also be considered. The tree species most preferred are ponderosa pine, western larch, and Douglas-fir. Specific design criteria for snags, green tree replacements, and down wood are as follows:

<table>
<thead>
<tr>
<th>Leave all snags 20 inches dbh and larger. If unavailable, leave at least 3 per acre over 10 inches dbh.</th>
<th>All ≥ 20</th>
<th>All ≥ 20</th>
<th>All ≥ 20</th>
<th>All ≥ 20</th>
<th>All ≥ 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Tree Replacements (per acre)</td>
<td>16</td>
<td>16</td>
<td>9</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Down Wood Pieces (per acre)</td>
<td>3 - 6</td>
<td>15 - 20</td>
<td>15 - 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter at the small end ≥ 12 inches</td>
<td>&gt; 12</td>
<td>≥ 12</td>
<td>≥ 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length per piece ≥ 6 feet</td>
<td>≥ 6</td>
<td>≥ 6</td>
<td>≥ 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total length per acre ≥ 20 feet</td>
<td>≥ 20</td>
<td>≥ 100</td>
<td>≥ 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protect known or discovered raptor nest sites from management and human disturbances until fledging has been completed. Level of protection will vary by species and will be recommended by the District wildlife biologist (Forest Plan pages 4-57).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescriptions for habitat connectivity corridors must maintain abundant medium diameter or larger trees, with total canopy closures within the top one-third (33%) of site potential.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not create forest openings through even-aged cutting methods that exceed 40 acres in size, unless allowed by exceptions provided in the Forest Plan.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Create natural appearing opening(s) when viewed individually and a natural appearing mosaic when viewed within the broader landscape.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Created openings and treatment units should not be symmetrical, or geometric in shape.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Straight lines and right angles should be avoided.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Created openings should resemble the size and shape of those found in the surrounding natural landscape.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Treatments should follow natural topographic breaks and changes in vegetation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Where small landforms exist, consider treating the entire landform rather than creating artificial lines and patterns.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Along sensitive roadways, vary unit sizes, widths, shapes and distance from the center line.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create natural appearing transition between treated and untreated vegetation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Utilize natural breaks in topography and vegetation type to delineate treatment edges.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Edges will be shaped and/or feathered to avoid a shadowing effect in the cut unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Where the unit is adjacent to denser forest, the percent of thinning within the transition zone will be progressively reduced toward the outside edge of the unit. In addition, vary the width of the transition zone.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18 A harvested area is considered a created opening for timber management when the prescribed crop tree stocking is below minimum acceptable levels and trees are at or below 4 ½ feet in height and/or not free to grow.
<table>
<thead>
<tr>
<th><strong>Design Criteria</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>d)</td>
<td>Where the unit interfaces with an opening, the percent of thinning within the transition zone will be progressively increased toward the outside edge of the unit. In addition, vary the width of the transition zone.</td>
</tr>
<tr>
<td>e)</td>
<td>Soften edges by thinning adjacent to existing unit boundaries, removing taller, older trees and favoring younger ones. This will reduce a vertical wall effect.</td>
</tr>
<tr>
<td>f)</td>
<td>Treatment boundaries should extend up and over ridgelines to avoid the “Mohawk” look. This is especially important along ridgelines silhouetted against the sky.</td>
</tr>
<tr>
<td>g)</td>
<td>Avoid widely spaced trees that are silhouetted along the skyline.</td>
</tr>
<tr>
<td>h)</td>
<td>Consider leaving single trees and/or groups of trees to visually connect with the unit’s edges.</td>
</tr>
<tr>
<td></td>
<td>Minimize patterns created by implementation and maintain natural appearing mosaic of vegetation across the landscape.</td>
</tr>
<tr>
<td>SCEN-3</td>
<td>a) Where multiple clear cuts are planned, vary the size and spacing across the project area.</td>
</tr>
<tr>
<td></td>
<td>b) Interlock individual openings to prevent artificial, isolated openings unrelated to topography or natural disturbance processes.</td>
</tr>
<tr>
<td></td>
<td>Maximize diversity of species and age class that are within the landscape’s natural range of variation/Forest Plan Desired Condition.</td>
</tr>
<tr>
<td>SCEN-4</td>
<td>a) Where feasible, leave a diversity of species and age classes.</td>
</tr>
<tr>
<td></td>
<td>b) Leave healthy, windthrow-resistant trees and groups of trees to add variety and interest.</td>
</tr>
<tr>
<td></td>
<td>c) A range of stem diameters should be left where compatible with silvicultural objectives.</td>
</tr>
<tr>
<td></td>
<td>Minimize long-term visual effects of access roads, skid trails, and landings.</td>
</tr>
<tr>
<td>SCEN-5</td>
<td>a) Side cast topsoil during the construction of temporary roads and use for later obliteration and recontouring.</td>
</tr>
<tr>
<td></td>
<td>b) Where new access roads and skid trails meet FSRD 40, they should intersect at a right angle and, where feasible, curve after the junction to minimize the length of route seen from the primary travel route.</td>
</tr>
<tr>
<td></td>
<td>c) Where feasible, retain screening trees one tree-height below roads and landings (including cable landings) when viewed from below. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing.</td>
</tr>
<tr>
<td></td>
<td>d) When viewed from above, retain, screening trees one tree-height above roads and landings and/or prescribe a higher leave basal area. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing.</td>
</tr>
<tr>
<td></td>
<td>e) Log landings, roads, gravel pits, borrow areas, and bladed skid trails should be minimized within the FSRD 40 viewshed.</td>
</tr>
<tr>
<td></td>
<td>Minimize slash piles and residue that appears man-made.</td>
</tr>
<tr>
<td>SCEN-6</td>
<td>a) Ensure slash is abated near landings by scattering, chipping, or other techniques.</td>
</tr>
<tr>
<td></td>
<td>b) In sensitive foreground areas, stumps should be cut to 6 inches or less in height, in immediate foreground, stumps should be cut to 2 inches or less in height.</td>
</tr>
<tr>
<td></td>
<td>c) Slash, root wads, and other debris will be removed, buried, burned, chipped or lopped to a height of 2 feet or less in sensitive view sheds. If slash is buried, locate in previously disturbed areas where possible.</td>
</tr>
<tr>
<td></td>
<td>Minimize the long term visual effects of skyline operations.</td>
</tr>
<tr>
<td>SCEN-7</td>
<td>a) Minimize the number of skyline corridors in visually sensitive areas.</td>
</tr>
<tr>
<td></td>
<td>Maintain a forest floor that appears natural and clear of excessive debris.</td>
</tr>
<tr>
<td>SCEN-8</td>
<td>a) In the immediate foreground (300 feet from FSRD 40Fuel loadings meeting reforestation and wildlife standards in middleground and background areas will normally be compatible with the visual objectives.</td>
</tr>
</tbody>
</table>
2.5 Alternatives Considered but Eliminated from Detailed Analyses

After consideration of all scoping comments as well as internal analysis, the three alternatives discussed in this chapter were finalized. There were no other alternatives proposed for consideration and subsequently dismissed.

2.6 Monitoring Framework

Monitoring for both implementation (whether the project was implemented as planned) and effectiveness (whether overall management objectives were met) would occur. Design criteria and Best Management Practices are incorporated into the project (Table 2-3).

Any action which might occur in this planning area will be considered for monitoring in the Umatilla National Forest annual BMP monitoring. District staff will conduct monitoring in areas that have the highest probability of showing effects.

- RHCA widths in harvest units, road maintenance work, and road use and maintenance during wet weather are items that will be monitored.
- The Forest Service contract representative or other staff will monitor during and after activities to insure sediment and soil disturbance objectives are met. If objectives are not met, Forest Service personnel will identify and implement corrective action and document modifications to be used in future projects.
- Number, size, and distribution of snags and down logs within a sample of units will be field checked by Forest Service personnel.
- Known invasive plant locations are identified prior to activities and will be re-assessed after project implementation where applicable.
- After prescribed fire treatments, Forest Service fire and fuel personnel will field check a sample of burned units to determine whether the prescription objectives (i.e. mortality, mineral soil exposure, fuel load reductions, etc.) have been met.
Chapter 3. Environmental Consequences

3.1 Introduction

This Environmental Consequences Chapter analyzes both beneficial and adverse effects that would result from implementing any of the alternatives considered in this DEIS. In accomplishment of these analyses, each resource section will describe the affected environment specific to that resource, as well as the effect analysis of each alternative, resource specific mitigation measures, and the cumulative effects.

Past, present, and reasonably foreseeable actions and affected environment of area resources are also mentioned, as described in Chapter 2.

Effects are shown as being direct (occurring at the same time and plane as the triggering action), indirect (separate in time or space from the action that caused them), or cumulative (incremental effect of the project when added to effects from other past, present, and reasonably foreseeable actions). Each resource specialist considered and included activities relevant to the individual resource in the cumulative effects analysis. Direct, indirect, and cumulative effects are described in terms of increases, decreases, intensity, duration, and timing. The discussion of these effects also provides a comparison of the trade-offs associated with each alternative. Relevant direction from Umatilla Land and Resource Management Plan (Forest Plan) and applicable laws, regulations, and agency policies are also discussed in this chapter. The scale of analysis may be different for each resource. This chapter ends with a discussion of compliance with environmental laws and executive orders.

3.2 Effects and Impacts

For the purpose of this EIS, it is imperative to explain the difference between effects and impacts, and how they are used in this document. For the purpose of this document, an effect from an action can be beneficial, adverse, or negligible. An impact, as used in this document, implies greater magnitude and is used to describe either beneficial or adverse conditions. That is, an action can effect a resource, but the action may not rise to the level of an impact to the resource. Effects and impacts are not used interchangeably in this document.

3.3 General Analyses Methodology and Assumptions

This chapter evaluates effects on the human environment (i.e., physical, natural, cultural, and socioeconomic resources) from proposed vegetation and fuels management alternatives. The approach includes the following elements:

- Focusing the analysis, to the greatest extent possible, on management changes and associated issues that could have meaningful impacts on the resources or values being evaluated.
- Using general analysis methods and assumptions that follow the USDA Forest Service National Environmental Policy Act Handbook (FS 2014).
- Evaluating cumulative effects for each resource topic.
- The importance and severity of effects from management activities are assessed and described in each resource topic as applicable. If effects are not likely to be significant, no determination on significance is provided.
3.4 General Analyses Methodology and Assumptions

The Interdisciplinary team reviewed a substantial body of scientific literature and studies applicable to the project areas and the associated resources. This information augments site-specific field studies, observations, and documentation gathered by IDT members to support the quantitative and qualitative statement presented for each analyzed resource. The effect analyses focuses on perceived or expected environmental issues from the implementation of the alternatives and their likelihood of being significant.

Assessing Effects and Impacts Using CEQ Criteria

According to the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR 1500-1508) the term *significantly* is based on the criteria of both context and intensity (40 CFR 1508.27).

Context: This means that the significance of an action must be analyzed in several contexts to include society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. Both short term and long term effects/impacts are relevant.

Intensity: This refers to the severity of magnitude of an effect. An EIS considers direct, indirect, and cumulative effects to determine intensity. The CEQ has identified set standards for conducting and presenting impact analysis.

Assumptions

The following guiding assumptions were used to provide context for this analysis:

**Analyses Period:** This DEIS considered management actions over 5-10 years, however, as long as there are no substantial changes to the proposed action that are relevant to environmental concerns, no new information and no changed conditions, management activities may continue without additional NEPA analyses.

**Duration of Effect:** Duration describes the length of time over which an effect may occur. Effects could occur over minutes, days, months, or years. Each analyses includes a description of the expected time frame over which effects are expected.

**Type of Effect:** Description of the effect as beneficial or adverse. A beneficial effect is one which moves current conditions found in the project area to conditions more in line with historical norms. While an adverse effect would be something that would negatively affect conditions found in the project area beyond the current conditions. While the current conditions are not necessarily desired, an adverse condition would be a further step backward. These effects however, have elements of duration, intensity, and magnitude as part of their analysis, meaning for examples they could be short term, minor, and beneficial effects.

3.5 Cumulative Effects

Past, Present, and Reasonably Foreseeable Actions

The temporal and spatial scale of analysis is variable depending on the resource concern being evaluated, particularly when considering the effects of past, present, and reasonably foreseeable actions. During the interdisciplinary process the team followed guidance provided by the CEQ.
Using this guidance the following summary of past, present, and reasonably foreseeable actions within and adjacent to Sunrise Vegetation and Fuels Management Project planning area was developed. These projects were considered, where relevant, when addressing cumulative effects for various resources.

Cumulative impact (or effect) is defined in CEQ regulations as, “…the impact on the environment which 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 non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

Summary of Past Actions
Some residual effects remain visible on the landscape and contribute to the description of the current conditions (affected environment). Past actions are maintained as a layer in the District’s Geographic Information System (GIS) database and are used in analysis for multiple forest-wide management goals including: calculating Equivalent Treatment Acres for watershed conditions, elk habitat effectiveness index (HEI), cover values for big game, soil conditions, and historic range of variability (HRV). In some cases, the activities listed below in Table 3-1 overlap in space.

- **Planting:** Approximately 3,812 acres were planted between 1967 and 2011.
- **Invasive Plant Treatments (Non-Mechanical):** Approximately 2,448 acres were treated between 2006 and 2015 within the planning area.
- **Wildfire:** Since 1910 approximately 10,781 acres, by 107 fires, have burned in the Sunrise planning area. Wildfire is unpredictable, but it is likely some portion of the planning area could burn in the foreseeable future.
- **Grazing: Asotin C&H Allotment** - Grazing has occurred at various levels beginning in the mid-1800s. Wild horses used the area from 1885 to 1910. The average amount of permitted livestock grazing from 1929 to 1964 was 815 head of cattle. Range improvements include: 28 springs, 29 ponds, 3 corrals, and 18 miles of fence (includes boundary fence) within the project planning area. **Peola Allotment** - grazing allotment totaling 39,238 acres with a seasonal total of 355 pair of cattle located in Asotin, Columbia and Garfield counties.

**Table 3-1. Past Vegetation Management Activities by Decade within the Sunrise project Area**

<table>
<thead>
<tr>
<th>Years</th>
<th>Treatment</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960 - 1969</td>
<td>Pre-commercial Thin</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>Single-Tree Selection</td>
<td>1,345</td>
</tr>
<tr>
<td></td>
<td>Stand Clearcut</td>
<td>3,313</td>
</tr>
<tr>
<td>1970 - 1979</td>
<td>Commercial Thin</td>
<td>1,131</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>1,220</td>
</tr>
<tr>
<td></td>
<td>Salvage Cut</td>
<td>537</td>
</tr>
<tr>
<td></td>
<td>Sanitation Cut</td>
<td>143</td>
</tr>
<tr>
<td></td>
<td>Shelterwood Cut</td>
<td>486</td>
</tr>
<tr>
<td></td>
<td>Single-tree Selection</td>
<td>4,372</td>
</tr>
<tr>
<td></td>
<td>Stand Clearcut</td>
<td>2,626</td>
</tr>
<tr>
<td>Years</td>
<td>Treatment</td>
<td>Acres</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>1980-1989</td>
<td>Pile Burning</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Commercial Thin</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>148</td>
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<tr>
<td></td>
<td>Range Seeding</td>
<td>365</td>
</tr>
<tr>
<td></td>
<td>Sanitation Cut</td>
<td>617</td>
</tr>
<tr>
<td></td>
<td>Shelterwood Cut</td>
<td>1,697</td>
</tr>
<tr>
<td></td>
<td>Single-tree Selection</td>
<td>612</td>
</tr>
<tr>
<td></td>
<td>Stand Clearcut</td>
<td>377</td>
</tr>
<tr>
<td>1990-1999</td>
<td>Broadcast Burning</td>
<td>1,259</td>
</tr>
<tr>
<td></td>
<td>Pile Burning</td>
<td>987</td>
</tr>
<tr>
<td></td>
<td>Overstory Removal Cut</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>1,588</td>
</tr>
<tr>
<td></td>
<td>Range Seeding</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>Shelterwood Cut</td>
<td>796</td>
</tr>
<tr>
<td></td>
<td>Single-tree Selection</td>
<td>1,413</td>
</tr>
<tr>
<td></td>
<td>Stand Clearcut</td>
<td>1,227</td>
</tr>
<tr>
<td></td>
<td>Underburn</td>
<td>5,040</td>
</tr>
<tr>
<td>2000-2009</td>
<td>Pile Burning</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Chipping of Fuels</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Commercial Thinning</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Fuel Break</td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>840</td>
</tr>
<tr>
<td></td>
<td>Rearrangement of Fuels</td>
<td>483</td>
</tr>
<tr>
<td></td>
<td>Salvage Cut</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Single-tree Selection</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Site Preparation</td>
<td>329</td>
</tr>
<tr>
<td></td>
<td>Underburn</td>
<td>4,266</td>
</tr>
<tr>
<td>2010-2016</td>
<td>Pile Burning</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Chipping of Fuels</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>Invasive Mechanical</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>Jackpot Burning</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Pre-commercial Thin</td>
<td>309</td>
</tr>
<tr>
<td></td>
<td>Salvage Cut</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>Thinning</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Underburn</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>Yarding</td>
<td>188</td>
</tr>
</tbody>
</table>

Summary of Present Actions (ongoing)

- **Invasive Plant Treatments:** Umatilla National Forest Invasive Plants Treatment FEIS and Record of Decision (ROD) (July 2010) will continue to be implemented. Invasive plant treatments (herbicide, hand pulling and biological agent release) is currently being done. Where appropriate, treated areas are seeded with local sources of native grasses and forbs after treatment.

- **Recreation:** Ongoing use of dispersed camping, hunting, and sightseeing occurs year-round. Public firewood gathering and snowmobile use will continue to occur.

- **Road Maintenance:** Road maintenance consists of a variety of activity components including surface rock replacement, spot surfacing, roadside brushing, erosion control, logging out, road surface blading, ditch cleanout, slide removal, dust abatement, culvert cleaning or
replacement, danger tree removal, and other items that contribute to the preservation of the existing road and its safe use.

- **Asotin Prescribed Burn**: Project consisting of 7,957 acres of Forest Service land 2,423 acres of Washington Fish and Wildlife (WDFW) land. Proposed treatments are located in the Asotin Creek Watershed and within Forest Plan Management Areas that allow prescribed fire.

- **Grazing: Asotin C&H Allotment**: The current number of permitted cow/calf pairs has been 495 since 1965, however, only 413 cow/calf pairs have actually grazed the allotment from 1995 to the present. The allotment area totals approximately 39,400 acres, of which about 21,000 acres are within the project planning area. Currently used pastures include the Park/Cook and Hogback pastures, totaling approximately 1,770 acres. **Peola Allotment** – The grazing allotment totaling 39,238 acres, includes the Lick and Charley pastures (8,000 acres), with a seasonal total of 355 pair of cattle.

### Summary of Reasonably Foreseeable Actions

- **Invasive Plant Treatments**: The 2,448 acres mentioned above plus an additional 3 percent of acres are planned for herbicide treatments based on current increases being noted. Where appropriate, treated areas will be seeded with local sources of native grasses and forbs after treatment.

- **Asotin Prescribed Burn**: This burn, as described above, is an ongoing fuels management project. The total prescribed acres will take multiple seasons to treat, and is therefore a foreseeable action as well.

- **Elk habitat projects**: Seeding and fertilizing key areas to enhance elk forage.

- **Road Maintenance**: Road maintenance would continue to be the same as identified above in ongoing activities.

- **Recreation**: Recreation use would continue to be the same as identified above in on-going activities.

### 3.6 Vegetation

This section incorporates by reference the Vegetation Specialist Report. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Introduction**

The purpose of this section is to look at the current conditions and the effects of the Sunrise Vegetation and Fuels Management Project on the vegetation in the project area. The Silvicultural conditions within the project area can best be described by examining species composition, structural stages, and forest density. The action alternatives were designed to move the existing conditions in the project area towards the desired conditions.

**Regulatory Framework**

This project is consistent with all applicable laws, rules, and regulations pertaining to National Forest vegetation affected by the decision alternatives. For a more detailed description of how this project meets the applicable laws please refer to the Silviculture Report.

The most important factor influencing whether, or to what degree, a forested area might be affected during implementation of an action alternative is management direction from the 1990 Land and Resource Management Plan for the Umatilla National Forest (Forest Plan). The Sunrise project area includes several Forest Plan Management Areas, with additional designation...
for Riparian Habitat Conservation Areas (RHCAs) adjoining rivers, streams, and other wetlands. This Forest-wide riparian habitat allocation is referred to as PACFISH (USDA Forest Service; USDI Bureau of Land Management 1995). Forest-wide and Management Area direction is incorporated by reference into this document. Additional vegetation management direction is provided by two amendments in particular: “Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales” (USDA Forest Service 1995; also known as Eastside Screens); and “Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho and Portions of California” (USDA Forest Service; USDI Bureau of Land Management 1995; also known as PACFISH).

**Methodology**

The Sunrise Vegetation and Fuels Management analysis area is defined in this report as all forested Umatilla National Forest lands in the North Fork Asotin and Lick Creek watersheds. This area is approximately 22,800 acres which includes all dry, moist, and cold uplands forest in the project area. The greater Sunrise Project Area includes both forested and non-forested areas and is approximately 33,150 acres in size. For the temporal context of this analysis, short-term will be defined as up to 10 years following the implementation for the activities and long-term will be defined as anytime time beyond that.

Indicators used for comparison purposes between alternatives include the following:

- **Forest vegetation species cover type:** the tree species or species group that occupies a majority or plurality of total canopy cover.
- **Forest vegetation structural stage:** the vertical architecture of coniferous vegetation occurring along a successional pathway.
- **Forest vegetation density class:** the relative occupancy of available site resources by coniferous forest vegetation, allocated into discrete classes by biophysical environment.

The methodology utilized to assess and disclose the existing conditions, direct, indirect, and cumulative effects of the activities included under the project’s action alternatives incorporated a variety of information sources. Any particular assessment method is associated with a set of both strengths (accuracy and precision) and weaknesses (uncertainty and error). This analysis of effects on forest vegetation resources derives assessment and analytical strength through multiple lines of evidence (Goetz et al. 2012). The various methods utilized for this report are described in detail in the Silviculture Specialist Report, along with their associated strengths and weaknesses. The methods are characterized in terms relevant to successful implementation of the National Environmental Policy Act and associated case law, which require or recommend that disclosure of environmental effects include consideration and discussion of data validation and error, use of methods standard in the field relevant to the resource being considered (in this case, forestry), and incomplete and/or unavailable information.

**Affected Environment**

The Sunrise project area totals 33,150 acres, of which 22,800 acres is dry, moist, and cold uplands forest.

**Species Composition**

The current composition and extent of forest species cover types within the Project Forest Analysis Area and a comparison between existing conditions and desired ranges are shown in Table 3-2. Desired conditions are stratified by biophysical environment (dry, moist, and cold
upland forest potential vegetation groups), as well as cover type extent and relative abundance. In general, cover types are defined by the tree species (or species group) that constitute a majority or plurality of occupied growing space in a delineated forest stand.

The existing cover types are dominated by late seral tree species and forest stands dominated by early seral species are under-represented (Table 3-2). Some old forests have shifted in both species composition and structure; for example, some ponderosa pine forests with an old forest-single stratum structure have shifted to a Douglas-fir cover type with an old forest multi strata structure. This undesirable condition is caused by combination of factors described further in the specialist report.

In the dry upland forest portion of the Sunrise project area, the Douglas-fir cover type currently exceeds the desired range, while the ponderosa pine cover type is below the desired range. Grand fir cover type is at the high end of the desired range. In the moist upland forest, the extent of Douglas-fir and Subalpine fir/spruce cover type currently exceed desired ranges, while the western larch and lodgepole pine cover types are less than desired ranges. In the cold upland forest, the extent of subalpine fir/spruce and Douglas-fir cover types currently exceed desired ranges, and the extent of lodgepole pine cover types are currently below desired ranges.

Table 3-2. Tree species cover type extent and distribution for forest Potential Vegetation Groups (PVGs) within the Sunrise Project Vegetation Analysis Area. Values listed in bold font currently exceed desired ranges; items in italics are currently below desired ranges.

<table>
<thead>
<tr>
<th>Species cover type / PVG</th>
<th>Tolerance class</th>
<th>Existing conditions</th>
<th>Desired Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>% of total</td>
<td>Low</td>
</tr>
<tr>
<td>Dry Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western juniper</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>Shade-intolerant</td>
<td>3793</td>
<td>34</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>Mixed-tolerant</td>
<td>5806</td>
<td>52</td>
</tr>
<tr>
<td>Western larch</td>
<td>Shade-intolerant</td>
<td>68</td>
<td>1</td>
</tr>
<tr>
<td>Broadleaved trees</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lodgepole pine</td>
<td>Shade-intolerant</td>
<td>19</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Western white pine</td>
<td>Mixed-tolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grand fir</td>
<td>Shade-tolerant</td>
<td>1116</td>
<td>10</td>
</tr>
<tr>
<td>Subalpine fir and spruce</td>
<td>Shade-tolerant</td>
<td>73</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Moist Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western juniper</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>Shade-intolerant</td>
<td>1292</td>
<td>13</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>Mixed-tolerant</td>
<td>3325</td>
<td>33</td>
</tr>
<tr>
<td>Western larch</td>
<td>Shade-intolerant</td>
<td>204</td>
<td>2</td>
</tr>
<tr>
<td>Broadleaved trees</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lodgepole pine</td>
<td>Shade-intolerant</td>
<td>1053</td>
<td>11</td>
</tr>
<tr>
<td>Western white pine</td>
<td>Mixed-tolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grand fir</td>
<td>Shade-tolerant</td>
<td>1853</td>
<td>19</td>
</tr>
<tr>
<td>Subalpine fir and spruce</td>
<td>Shade-tolerant</td>
<td>2230</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Cold Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass-forb</td>
<td>Not applicable</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shrub</td>
<td>Not applicable</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Western juniper</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>Mixed-tolerant</td>
<td>295</td>
<td>18</td>
</tr>
<tr>
<td>Western larch</td>
<td>Shade-intolerant</td>
<td>74</td>
<td>5</td>
</tr>
<tr>
<td>Broadleaved trees</td>
<td>Shade-intolerant</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lodgepole pine</td>
<td>Shade-intolerant</td>
<td>129</td>
<td>8</td>
</tr>
</tbody>
</table>
Forest Structural Stages

The existing structural stages in the Sunrise project area generally reflect the succession, vegetation growth, and lack of recent disturbance. Structural stages that are created by recent and regular intervals of disturbance are under-represented and structural stages representing a lack of disturbance are over-represented. Table 3-3 displays the existing and desired conditions for forest structural stages within each upland forest potential vegetation group for the project area. For further information on structural stages and how they are derived please refer to the Silviculture Specialist report.

In the dry upland forest, the understory reinitiation and old forest multi-strata structures currently exceed desired ranges, and the extent of stand initiation, stem exclusion, and old forest single stratum structural stages are below desired ranges. In the moist upland forest, the old forest multi-strata structural stage currently exceeds the desired range, and the extent of old forest single stratum structural stage is below the desired range. In the cold upland forest, the understory reinitiation and old forest multi-strata structural stages currently exceed desired ranges, and the extent of stem exclusion and old forest single stratum structural stages are below desired ranges. Table 3-3 shows the existing and desired extent of each structural stage in the project area.

### Table 3-3. Forest structural stage extent and distribution for forest Potential Vegetation Groups (PVGs) within the Sunrise project Vegetation Analysis Area. Values listed in bold font currently exceed desired ranges; items in italics are currently fall below desired ranges.

<table>
<thead>
<tr>
<th>Dry Upland Forest</th>
<th>Existing Conditions</th>
<th>Desired Conditions</th>
<th>Moist Upland Forest</th>
<th>Existing Conditions</th>
<th>Desired Conditions</th>
<th>Cold Upland Forest</th>
<th>Existing Conditions</th>
<th>Desired Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>% of total</td>
<td>Percent of PVG</td>
<td>Acres</td>
<td>% of total</td>
<td>Percent of PVG</td>
<td>Acres</td>
<td>% of total</td>
</tr>
<tr>
<td>Stand Initiation</td>
<td>432</td>
<td>4</td>
<td>Low 30  1,647</td>
<td>1,691</td>
<td>17</td>
<td>Low 20  1,993</td>
<td>387</td>
<td>24</td>
</tr>
<tr>
<td>Stem Exclusion</td>
<td>96</td>
<td>9</td>
<td>Low 19  1,098</td>
<td>1,629</td>
<td>16</td>
<td>Low 20  1,993</td>
<td>96</td>
<td>6</td>
</tr>
<tr>
<td>Understory Reinitiation</td>
<td>2,288</td>
<td>21</td>
<td>Low 5  4,391</td>
<td>1,467</td>
<td>15</td>
<td>Low 25  1,494</td>
<td>655</td>
<td>41</td>
</tr>
<tr>
<td>Old Forest Single-Stratum</td>
<td>843</td>
<td>8</td>
<td>Low 65  4,391</td>
<td>22</td>
<td>&lt;1</td>
<td>Low 20  996</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Old Forest Multi-Strata</td>
<td>6,450</td>
<td>59</td>
<td>Low 15  2,195</td>
<td>5,153</td>
<td>52</td>
<td>Low 20  1,993</td>
<td>422</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>10,977</td>
<td></td>
<td></td>
<td>9,963</td>
<td></td>
<td></td>
<td>1,584</td>
<td></td>
</tr>
</tbody>
</table>
**Note:** Total forested acres for each potential vegetation group may differ than total acres reported in Table 4 because they do not include bare ground and other non-forest locations classified under a potential forested vegetation group.

**Forest Density**

Stand density refers to a measure of the amount of tree vegetation per unit of land area. The current and desired type and extent of forest vegetation structural stages within the Sunrise project area are described in Table 3-4. Desired conditions are stratified by biophysical environment and forest density classes. Across all biophysical environment types high density is over represented while low and moderate density classes are below the desired range.

**Table 3-4 Forest density class extent and distribution for forest Potential Vegetation Groups (PVG) within Sunrise Vegetation Analysis Area. Values listed in bold currently exceed desired ranges; items in italics are currently below desired ranges.**

<table>
<thead>
<tr>
<th>Potential Vegetation Group</th>
<th>Existing Conditions</th>
<th>Desired Conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>% of total</td>
<td>Low</td>
</tr>
<tr>
<td>Dry Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>695</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>Moderate</td>
<td>1,605</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>High</td>
<td>8821</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>11,121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moist Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>773</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Moderate</td>
<td>2,012</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>High</td>
<td>7,190</td>
<td>72</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>9,963</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cold Upland Forest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>47</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Moderate</td>
<td>186</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>High</td>
<td>1,390</td>
<td>86</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>1,622</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Atmospheric Greenhouse Gas Emissions**

See Chapter 3, Cumulative Effects, Global Climate Change.

**Environmental Consequences**

**Direct and Indirect Effects**

**Alternative A (No Action)**

Under the project No Action Alternative, ongoing disturbance and succession processes influencing vegetation conditions in the Sunrise area would continue as they have in the recent past without additional treatment. If none of the proposed activities would be implemented to move existing conditions closer to desired conditions, then forest vegetation within the project planning area would remain excessively dense and continue to be dominated by mid- and late-seral stages of species composition. Old forest single-strata structure on moist-forest sites would continue to be deficient because proposed activities would not be used to increase tree growth and thereby promote large-diameter trees (trees whose diameter is 21 inches or greater), or to reduce stand density sufficiently for establishment of a new cohort (stratum) of understory trees. Vegetation within the area would also become more susceptible to insect, dwarf mistletoe, disease and wildfire disturbances.
**Alternative B**

**Species composition**

Alternative B emphasizes the retention of early seral species and the removal of late seral species across all three biophysical environments. Changes in species composition would vary based on the existing composition of the stand and amount of overstory cut or killed by fire application. In this section there will be references to “mix” stands. These are stands in which activity is not likely to change the current species majority, but is likely to create growing space for more desirable early seral species.

If a stand cover type is expected to change as a result of a silvicultural treatment, it would move from a late seral species cover type to a mix type or early seral type. Implementing this action alternative would result in an increase of early seral and mix cover types, and a decrease of late seral types. Over time it is expected that up to 3,364 acres in Dry Upland Forest, 3,270 acres in Moist Upland Forest, and 776 acres Cold Upland Forest have the potential to move from late seral to early seral species groups. Some treatment areas may not change species type as a result of activity implemented during this project, and this is likely due to minimal tree mortality during treatment. Treatment of those acres may still have an effect on the structural stage of the stand and the tree density.

**Forest Structure**

The direct effects of implementing the activities described in Alternative B of the project on forest structural stage are described in Table 3-5. Effects within the project area are driven by changes of existing species composition and tree size. Compositional changes have minor influence on structural stage, but tree-size changes have major influence on structural state outcomes. Some structural changes are designed to reflect constraints and objectives associated with the Umatilla Forest Plan and Eastside Screens amendment.

Overall there will be an increase in the Stand Initiation, Stem Exclusion, and Old Forest Single-Stratum stand stages that are currently deficient. There will be a decrease in the stand stages currently exceeding the desired conditions: Understory Re-Initiation and Old Forest Multi Strata. The changes in the stand structures are expected to bring all of the stands to within the desired ranges. Old Forest Single Stratum is expected to increase over time due to decreased densities within the stem exclusion and understory re-initiation stages.

**Table 3-5. Direct effects of project implementation in forest structure stages.** Comparison of current existing conditions, post treatment conditions for Alt. B and Alt. C, and the changes from existing conditions in Alt. B and Alt. C. Values listed in bold currently exceed desired ranges, items listed in italics are currently below desired ranges.

<table>
<thead>
<tr>
<th>Dry Upland Forest</th>
<th>Existing Conditions</th>
<th>Post-treatment Alt B</th>
<th>Post-treatment Alt C</th>
<th>Change from Existing Alt B</th>
<th>Change from Existing Alt C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres.</td>
<td>%</td>
<td>Acres.</td>
<td>%</td>
<td>Acres.</td>
</tr>
<tr>
<td>Stand Initiation (SI)</td>
<td>432</td>
<td>4</td>
<td>488</td>
<td>4</td>
<td>488</td>
</tr>
<tr>
<td>Stem Exclusion (SE)</td>
<td>965</td>
<td>9</td>
<td>1,827</td>
<td>17</td>
<td>1,467</td>
</tr>
<tr>
<td>Understory Reinitiation (UR)</td>
<td>2,288</td>
<td>21</td>
<td>1,633</td>
<td>15</td>
<td>1,993</td>
</tr>
<tr>
<td>Old Forest Single-Stratum (OFSS)</td>
<td>843</td>
<td>8</td>
<td>2,733</td>
<td>25</td>
<td>2,484</td>
</tr>
<tr>
<td>Old Forest Multi-Stratum (OFMS)</td>
<td>6,450</td>
<td>59</td>
<td>4,297</td>
<td>39</td>
<td>4,546</td>
</tr>
<tr>
<td>Total</td>
<td>10,977</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Existing Conditions vs. Post-treatment Change from Existing

<table>
<thead>
<tr>
<th></th>
<th>Existing Conditions</th>
<th>Post-treatment</th>
<th>Change from Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres.</td>
<td>%</td>
<td>Ac.</td>
</tr>
<tr>
<td><strong>Moist Upland Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>1,691</td>
<td>17</td>
<td>2,258</td>
</tr>
<tr>
<td>SE</td>
<td>1,629</td>
<td>16</td>
<td>2,246</td>
</tr>
<tr>
<td>UR</td>
<td>1,467</td>
<td>15</td>
<td>529</td>
</tr>
<tr>
<td>OFSS</td>
<td>22</td>
<td>&lt;1</td>
<td>1,975</td>
</tr>
<tr>
<td>OFMS</td>
<td>5,153</td>
<td>52</td>
<td>2,954</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cold Upland Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>387</td>
<td>24</td>
<td>432</td>
</tr>
<tr>
<td>SE</td>
<td>96</td>
<td>6</td>
<td>480</td>
</tr>
<tr>
<td>UR</td>
<td>655</td>
<td>41</td>
<td>226</td>
</tr>
<tr>
<td>OFSS</td>
<td>25</td>
<td>2</td>
<td>245</td>
</tr>
<tr>
<td>OFMS</td>
<td>422</td>
<td>27</td>
<td>201</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,584</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Forest Density

All activities would be conducted to reduce total stand density, albeit Alternative B will reduce densities more than Alternative C. In stands designated as habitat connectivity corridors or elk cover, density reductions would mostly occur in the understory with minimal reductions in overstory. In most areas, total stand density will be reduced to varying degree. Density reductions planned for both action alternatives reflect a balance: the relative proportion of desirable and undesirable species, and wildlife habitat cover. Alternative B favors vegetation changes by including more acres of density reduction and removal of undesirable trees. The direct effects of implementing the activities described under Alternatives B of the project on forest density classes are described in Table 3-6.

Overall, Alternative B lowers the percentage of high density stands and raises the amount of low and moderate densities across all three biophysical environments. The resulting change will bring all three into the desired conditions for forest density.

### Table 3-6. Direct effects of implementing the activities described under Alternatives B and C on forest density classes.

<table>
<thead>
<tr>
<th></th>
<th>Existing Conditions</th>
<th>Post-treatment</th>
<th>Change from Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ac.</td>
<td>%</td>
<td>Ac.</td>
</tr>
<tr>
<td><strong>Dry Upland Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>695</td>
<td>6</td>
<td>1,417</td>
</tr>
<tr>
<td>Moderate</td>
<td>1,605</td>
<td>14</td>
<td>5,525</td>
</tr>
<tr>
<td>High</td>
<td>8,821</td>
<td>79</td>
<td>4,490</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,121</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Moist Upland Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>773</td>
<td>8</td>
<td>3,480</td>
</tr>
<tr>
<td>Moderate</td>
<td>2,012</td>
<td>20</td>
<td>3,463</td>
</tr>
<tr>
<td>High</td>
<td>7,198</td>
<td>72</td>
<td>3,119</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9,983</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cold Upland Forest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Susceptibility to future insect and disease disturbance

Direct effects of an action alternative result in shifts of structure, stand density and tree vigor. These conditions that are less susceptible to most bark beetles, non-native adelgids, dwarf mistletoes, and defoliators (Schmitt and Powell 2012 and references therein, Schooley and Bryant 1978). Shifts in species composition in favor of early seral species does not eliminate tree or stand susceptibility to biotic damage agents, as these tree species serve as hosts for their own variety of pests.

The project action alternatives are expected to reduce general susceptibility across the Sunrise project area in two additional ways. The first, is that the action alternatives would diversify species composition across the landscape by increasing under-represented species, (Table 3-5). This method of reducing susceptibility does so by reducing the overall amount of host species in a given stand, as well as reducing the vulnerability of remaining host species, as they are more isolated within a broader landscape and less prone to disturbance propagation and dispersion. Early seral species such as western white pine and western larch are all relatively drought-tolerant and thus resistant to attack by damage agents which seek drought stressed hosts. The second way the project will have direct effects on forest susceptibility is by immediately shifting species composition toward host species less prone to stress-induced biotic disturbances.

Alternative C

Species composition

Alternative C emphasizes the retention of early seral species and the removal of late seral species across all three biophysical environments. Changes in species composition would vary based on the existing composition of the stand and amount of overstory cut or killed by fire application. As in the Alternative B section, this section will refer to “mix” stands. Forest activity will not immediately change the majority species for mixed-species stands, but it will provide growing space for early seral species.

If a stand cover type is expected to change as a result of a silvicultural treatment, it would move from a late seral species cover type to a mix type or early seral type. Implementing this action alternative would result in an increase of early seral and mix cover types, and a decrease of late seral types. Over time it is expected that up to 2,983 acres in Dry Upland Forest, 1,743 acres in Moist Upland Forest, and 458 acres in Cold Upland Forest, will potentially move from late seral to early seral species groups. Some treated areas did not change species type due to minimal tree mortality due to treatment activity. Treatment of those acres may still have an effect on the stand structure and density.

Forest Structure

The direct effects of implementing the activities described under Alternative C of the Project on forest stand structure are described in Table 3-5. Effects within the project area are driven by changes of existing species composition and tree size. Some structural changes are designed to
reflect constraints and objectives associated with the Umatilla Forest Plan and Eastside Screens amendment.

Overall, there will be an increase in the Stand Initiation, Stem Exclusion, and Old Forest Single Stratum stages that are currently present. There will be a decrease in the stand stages currently exceeding the desired conditions; Understory Re-Initiation and Old Forest Multi Strata. The changes in the stand structures are expected to bring all of the stands to within the desired ranges. Old Forest Single Stratum is expected to increase over time due to decreased densities within the stem exclusion and understory re-initiation stages.

**Forest Density**

All activities would be expected to reduce total stand density, albeit Alt. C will retain higher densities than Alt. B. In stands designated as habitat connectivity corridors or elk cover, density reductions would mostly occur in the understory with minimal reductions in overstory cover. In most areas, total stand density will be reduced to varying degree. Density reductions planned for both action alternatives reflect a balance struck between the relative proportion of desirable and undesirable species, and wildlife habitat cover. Alternative C favors providing wildlife habitat by disturbing fewer acres in the short term. The direct effects of implementing the activities described under Alternatives C of the Project on forest density classes are described in Table 3-6.

Overall, Alternative C lowers the percentage of high density stands and raises the amount of low and moderate densities class across all three biophysical environments, but to a lesser extent than results from implementation of alternative B. The resulting change will bring all three into the desired conditions for forest density.

**Susceptibility to future insect and disease disturbance**

Direct effects of an action alternative result in shifts of structure, stand density and tree vigor. These shifts will result in lower susceptibility to most bark beetles, non-native adelgids, dwarf mistletoes, and defoliators (Schmitt and Powell 2012, Schooley and Bryant 1978). Shifts in species composition in favor of early seral species does not eliminate tree or stand susceptibility to biotic damage agents, as these tree species serve as hosts for their own variety of pests.

The project action alternatives are expected to reduce general susceptibility across the Sunrise Forest Vegetation Analysis Area in two additional ways. First, is that the action alternatives would diversify species composition across the landscape by increasing under-represented species (Table 3-5). This method of reducing susceptibility does so by reducing the overall amount of host species in a given stand, as well as reducing the vulnerability of remaining host species, as they are more isolated within a broader landscape and less prone to disturbance propagation and dispersion. The second way project will have direct effects on forest susceptibility is by immediately shifting species composition toward of host-species less prone to stress-induced biotic disturbances. Early seral species such as, western white pine, and western larch are all relatively drought-tolerant and thus resistant to attack by damage agents which seek drought-stressed hosts.

**Alternative B and C Indirect Effects**

**Species Composition**

Areas affected by Action Alternatives would develop along their natural succession earlier than if the activities had not occurred. The mixed cover type would retain more early seral, fire tolerant species than the No Action Alternative. Even with the stand movement toward early seral
species, all but the driest of stands will retain some presence of late seral species. This would allow for the establishment of shade tolerant species in the understory in the years following treatment. Regardless, desired, early-seral species will be promoted best under either Action Alternative.

**Forest Structure**

The indirect effects of either Action Alternative would move treated areas to a late forest structure sooner than if no action had occurred. (Crane and Fisher 1986, O’Hara et al. 1996). Future moderate or severe disturbances could convert areas to an earlier stage. Future low-severity disturbances would most likely maintain the old forest single-stratum stage by creating mortality in recently developed understory trees. Conversely, low-severity disturbance could move stands toward old forest multi-stratum through over-story mortality, creating openings which would allow for the development of understory cohorts.

**Forest Density**

Relative stand density is likely to increase over the next decade as a result of the density reduction from either Action Alternative. Long term impacts will be determined by ongoing activities within the project area. Further management will help reduce stand densities toward desired condition.

**Susceptibility to future insect and disease disturbance**

As the direct effects of both action alternatives on forest density class, structural stage, and cover type diminish over time, effectiveness on the reduction of susceptibility to insect and disease will also decrease. The cumulative effects of wildfire suppression in the project Sunrise Forest Vegetation Analysis Area will enable forests to develop multi-strata canopies, shade-tolerant species to flourish, and stand density to increase, all of which are associated with increased susceptibility to a host of future biological disturbances. Unless future disturbances decrease stand density, canopy layering, or the amount of host species, susceptibility to such disturbances will gradually increase to pre-implementation levels over a 50 to 75-year period.

**Mitigation Measures**

*Silvicultural design features related to the Eastside Screens Forest Plan amendment and Important Habitat Features*

One of the Old Forest structure classes (OFSS) falls below HRV in all three biophysical environments present within the project area. Both action alternatives fall under Scenario A of the Eastside Screens Forest Plan Amendment (see Appendix C). In order to ensure consistency with the Screens amendment, the following design features are incorporated into both action alternatives for the Sunrise project:

- Maintain all remnant late and old seral, and/or structural live trees ≥ 21” dbh that currently exist within stands proposed for harvest activities.
- All timber harvest activities outside of LOS forests must be prescribed in such a manner that it does not prevent attainment of HRV within the project analysis area for both LOS types (single and multi-stratum). All prescriptions will emphasize the retention of individual trees and tree species sufficient to maintain or attain minimum requirements for old forest, as described in the Forest Plan.
- Prescriptions for habitat connectivity corridors must ensure the retention of abundant medium or larger diameter trees, and canopy closures within the top one-third (33%) of site potential.
• Do not create forest openings\(^\text{19}\) through even-aged cutting methods that exceed 40 acres in size, unless allowed by exceptions provided in the Forest Plan.
• Prescriptions for habitat connectivity corridors must retain some level of understory (if any already exists) and left in patches or scattered to assist in supporting stand density and cover.
• Where open, park-like conditions occurred historically (pre-settlement areas characterized by frequent, low-severity fire regimes), maintain such conditions by implementing intermediate treatments and/or emphasize the removal of fire-intolerant species. Maintain a sufficient number of seedlings, saplings, and poles to allow for the development of future stands.
• Slash will not be piled against large trees or snags to prevent loss from prescribed fire.
• Hollow or partially hollow, broken top snags greater than 15 inches DBH will be left to provide roost habitat for bats. Dead grand fir most commonly provides hollow tree habitat.
• Protect goshawk nests from disturbance if any are located during project activities. Defer harvest on 30 acres of the most suitable nesting habitat around nest sites. Retain late and old structure forest in a 400-acre post-fledging area (PFA) as determined by the district biologist. Defer activities in active PFAs from April through August.
• Protect known or discovered raptor nest sites from management and human disturbances until fledging has been completed. Level of protection will vary by species and will be recommended by the District wildlife biologist (FP 4-57).
• Seeps, springs, bogs, wallows, and other wet areas will be evaluated and protection measures determined by the District wildlife biologist (FP 4-57, 4-160).
• If cliffs, talus or cave habitat is found, protection measures will be determined by the District wildlife biologist. (FP 4-57)
• Concerning snag retention, retain all snags 20 inches DBH and larger, except for hazard trees. If there are less than 3 large snags per acre available, smaller snags will be retained to meet 3 per acre. Maintain down wood habitat and green replacement trees at or beyond levels identified in the table below. Tree species and soundness at the base will also be considered. The tree species most preferred are ponderosa pine, western larch, and Douglas-fir. For a per-acre reference see Table 3-6 below.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
Snag and Down Wood Retention & Ponderosa pine & Mixed conifer & Grand fir & Lodgepole pine & Subalpine zone \\
\hline
Leave all snags 20 inches dbh and larger. If unavailable, leave at least 3 per acre over 10 inches dbh. & All (3) & All (3) & All (3) & All (3) & All (3) \\
\hline
Green Tree Replacements (per acre) & 16 & 16 & 9 & 14 & 19 \\
\hline
Down Wood Pieces (per acre) & 3 - 6 & 15 - 20 & 15 - 20 & & \\
\hline
Diameter at the small end & $\geq 12$ inches & $\geq 12$ inches & $\geq 8$ inches & & \\
\hline
Length per piece & $\geq 6$ feet & $\geq 6$ feet & $\geq 8$ feet & & \\
\hline
Total length per acre & $\geq 20$ feet & $\geq 100$ feet & $\geq 120$ feet & & \\
\hline
\end{tabular}
\caption{Snag and down wood retention per acre by forest vegetation community type}
\end{table}

\(^{19}\) A harvested area is considered a created opening for timber management when the prescribed crop tree stocking is below minimum acceptable levels and trees are at or below 4 ½ feet in height and/or not free to grow.
Cumulative Effects

Alternative A

Under the project No Action Alternative, ongoing disturbance and succession processes influencing vegetation conditions in the Sunrise area would continue as they have in the recent past without additional treatment. It is reasonable to assume other actions would continue in other areas and generally move landscape towards desired conditions. Cumulatively, however, the impacts would not be as positive if no action was chosen compared to the action alternatives.

Alternatives B and C

Cumulative effects analysis must consider the effects of all past, present, and reasonably foreseeable future actions. For a full list of past, present, and reasonably foreseeable future actions please refer to Table 10 in the Silviculture Specialist Report.

All past actions, which include timber harvest, reforestation, non-commercial thinning and prescribed fire, established the existing conditions found in the project area today. The cumulative effects of this project, along with past projects in the project area, can be considered positive long term effects on vegetation.

Present vegetative treatment activities occurring in the project area include but are not limited to, the Asotin Burn and Non-commercial thinning. These activities were created with a similar purpose and need to the Sunrise project and should have positive amplifying effects with the Sunrise Project. Similarly, all reasonably foreseeable future vegetative actions would likely be created with a similar purpose and need and would take in to account the effects of the Sunrise Project in their existing conditions. All future projects would have a positive effect on forest health. Past, present, and future non-vegetative treatment such as campground maintenance, cattle grazing, and issuance of special forest products are likely to have negligible cumulative effects on forest vegetation. Due to the similarity of purpose and needs and the need for continued action to maintain desired vegetative conditions, the action alternatives will have a more positive cumulative effect than the No Action alternative.

Irreversible and Irretrievable Commitment of Resources

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.7 Fuels

This section incorporates by reference the Fuels Specialist Report. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

Introduction

The implementation of either action alternative has the potential to impact the health and safety of local residents and those utilizing public lands by increased smoke in the area. In addition, excess fuel loading is outside the range of historic variability (see Silviculture Specialist Report). Either through inaction, Alternative A, and the continued risk of large wildfires, or through prescribed fire, air quality was identified as a resource that should be analyzed for potential impacts.
Regulatory Framework

Implementation of Alternatives B or C complies with the Forest Plan and desired condition for fire and fuels as outlined in the report. The Umatilla National Forest Land and Resource Management Plan (USDA Forest Service 1990) provides the overall direction of management activities on the Forest. Forest-wide management goals, as well as management area direction, represent the desired future condition that management actions are designed to achieve. The projects meet the desired future conditions for the following management areas: A4-Viewshed 2, A6-Developed Recreation, C1-Dedicated Old Growth, C3-Big Game Winter Range, C4-Wildlife Habitat, C5-Riparian, C8-Grass Tree Mosaic, and E2-Timber and Big Game.

Methodology

Information for this fuels analysis was gathered and synthesized from field reconnaissance, the Umatilla National Forest’s Geographic Information System (GIS), historic vegetation mapping, FS Veg Spatial and FS Veg Data Analyzer, and FVS Fire and Fuels Extension. Existing condition and effects analyzed for this project includes only the Forest Service portion of the planning area for approximately 32,000 acres. Project activities, in conjunction with past, ongoing, and reasonably foreseeable activities, have effects on fuels and fuel continuity; therefore, the planning area is sufficient to display effects on the landscape. All acres in the project planning area were assigned a fire regime and condition class, as well as evaluated for crown fire potential.

Indicators

Indicators used in the analysis of the vegetation and fuel activities occurring in the Sunrise planning area are acres of fire regime 1, 2 and 3 in condition classes 2 and 3, and historical range of variability (HRV) for both dry and moist forest that support high density conditions and level of crown fire potential.

Fire Regime Condition Class and Historical Range of Variability (RV)

A natural fire regime is a classification of the historical role fire would play across the landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Fire regimes are classified based on the average number of years between fires (frequency) combined with the severity of the fire. Severity can be low (surface fires), mixed (less than 75 percent of overstory mortality), and high (greater than 75 percent overstory mortality). There are four historical fire regimes which commonly occur in the Blue Mountains (Powell 2005). They are fire regimes 1, 2), 3 and 4. Fire regime 3 and 4 have sub-regimes which are defined with more detail based on region specific characteristics identified by local resource experts and regional fire ecologist, and are based on Umatilla National Forest historical fire data. The four fire regimes and sub-regimes are described further in Table 3-7.

Table 3-8. Characteristics of common Oregon and Washington fire regimes present within Sunrise project area.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Return Interval (years)</th>
<th>Severity</th>
<th>Potential Plant Communities</th>
<th>Historical Burned Area21 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;25 – 35</td>
<td>Low, Surface Fire</td>
<td>Ponderosa pine, dry Douglas-fir</td>
<td>75</td>
</tr>
</tbody>
</table>

21 Historical burned area is an estimate of annual burned area (percent) for the Blue Mountains prior to Euro-American settlement (defined as pre-18500. Data were derived from Agee (1996).
Sunrise Vegetation and Fuels Project

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Return Interval (years)</th>
<th>Severity</th>
<th>Potential Plant Communities</th>
<th>Historical Burned Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>&lt;35</td>
<td>Mixed, High</td>
<td>True grasslands</td>
<td>5</td>
</tr>
<tr>
<td>3A</td>
<td>&lt;50</td>
<td>Mixed</td>
<td>Mixed conifer, dry Douglas-fir, dry grand fir</td>
<td>15</td>
</tr>
<tr>
<td>3B</td>
<td>50-100</td>
<td>Mixed</td>
<td>Warm, mesic grand fir</td>
<td></td>
</tr>
<tr>
<td>3C</td>
<td>100-200</td>
<td>Mixed</td>
<td>Mesic grand fir and Douglas-fir</td>
<td></td>
</tr>
<tr>
<td>4C</td>
<td>100-200</td>
<td>High</td>
<td>Subalpine mixed conifer (spruce-fir), western larch</td>
<td>5</td>
</tr>
</tbody>
</table>

Fire Regime Condition Class (FRCC) describes the amount of departure of the landscape from the historical fire regime. Condition class describes the condition of the landscape by characterizing the vegetation’s departure from its historical range of variability. This characterization describes the landscapes vulnerability to uncharacteristic wildfire intensities, severities, and insect and disease susceptibility. Condition Class is divided into three categories. Condition Class 1, within the historical range of variability of vegetation and fuels composition. Condition Class 2, is moderately altered from historic conditions. Condition Class 3, substantially altered from historic conditions. Table 3-9 below describes condition class in more detail below.

### Table 3-9 Fire Regime Condition Class Descriptions

<table>
<thead>
<tr>
<th>Condition Class</th>
<th>Description</th>
<th>Species Composition and Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Within the historical range of variability of the vegetation characteristics; fuel composition; fire frequency, severity and pattern</td>
<td>Species composition and structure are function within their historical range.</td>
</tr>
<tr>
<td>2</td>
<td>Fire regimes have been moderately altered from historical range. Fire frequencies have departed from natural historical frequencies by one or more return intervals. The result is moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns.</td>
<td>Species composition and structure have been moderately altered. For example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grassland – Moderate encroachment of shrubs and trees or invasive exotic species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forestland – Moderate increase in density, encroachment of shade tolerant tree species, moderate fire tolerant tree species.</td>
</tr>
<tr>
<td>3</td>
<td>Fire regimes have been substantially altered from their historical range. Fire frequencies have departed from natural frequencies by multiple return intervals. Dramatic changes occur to one or more of the following: fire size, intensity and severity and landscape patterns.</td>
<td>Species composition and structure have been substantially altered from their historical range. For example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grassland – High encroachment and establishment of shrubs, trees, or invasive exotic species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forestland – High increases in density, encroachment of shade tolerant tree species, or high loss of fire tolerant tree species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High mortality or defoliation from disease and insect.</td>
</tr>
</tbody>
</table>

Historical range of variability (HRV) is a conservation strategy used to establish reference conditions for managing landscapes. These reference conditions describe the forest composition and structure that existed before Euro-American settlement. For the northern Blue Mountains, HRV uses a range of reference conditions pertaining to the pre-settlement era (mid 1800’s)
(Powell 2009, Schmidt et al. 2002). HRV was used with a wide variety of vegetation indicators, such as species composition, stand density, canopy biomass, and insect and disease susceptibility, when completing analysis for the Sunrise planning area.

**Crown Fire Potential**

Crown fire potential describes a stands ability to initiate and sustain a crown fire. Some fire regimes experience crown fires under historic conditions (fire regime 4). For others, such as fire regime 1 and 3, sustained crown fires are uncharacteristic. The spatial continuity and density of tree canopies in combination with wind and physical setting provide the conditions for crown fires (Graham, McCaffrey and Jain 2004). Canopy base height\(^{22}\), canopy bulk density\(^{23}\), and canopy continuity are key characteristics of forest structure that affect the initiation and propagation of crown fire (Albini 1976, Rothermel 1991). Canopy base height is important because it affects crown fire initiation and canopy continuity influences the spread of fire (Graham 2004).

Ladder fuels, as they relate to canopy base height, provide avenues for fire to move from the ground to the tree crowns. Stands with low canopy base height are more susceptible to crown fires. Crown fires are high intensity wildfires that advance through a stand’s canopy and can exhibit extreme fire behavior that is difficult and dangerous to suppress, and cause economic damage (Keyes 2002). They occur when surface fires create enough energy to preheat and combust live fuels well above the ground or when ladder fuels, in the form of small seedlings, saplings and young trees with low hanging branches, carry fire into the upper canopy. There are two stages of crown fires: the initiation of crown fire activity, referred to as “torching” (also known as passive crown fire), and the process of active crown fire spread, where fire moves from tree crown to tree crown. Torching commences when the surface flame length exceeds a critical threshold, defined by (Van Wagner 1977) as a function of the moisture content of overstory foliage and the vertical distance to live crown, known as canopy base height (CBH). Once in the crowns, fire must maintain a minimum rate of spread to become an active crown fire and is primarily determined by topography and weather conditions. The spread rate required to keep fire in the crown hinges on the density (Agee 2005) of fuels in the canopy, called canopy bulk density (CBD) (Keyes and O'Hara 2002). Torching and crowning also create fire brands that can spread fire well beyond their source, increasing fire spread to adjacent stands. Crowning significantly limits fire suppression options, requiring suppression personnel to rely on aerial resources or implement other indirect attack techniques.

**Affected Environment**

**Fire Regime Condition Class and Historic Range of Variability (HRV)**

The Sunrise project planning area is comprised of 35 percent fire regime 1, 29 percent fire regime 2, 18 percent fire regime 3, and 18 percent fire regime 4. Table 3-10 displays the historical fire regimes and associated acres present in the project area, and the Figure 3-2 visually displays the fire regimes throughout the Sunrise project planning area.

\(^{22}\) Canopy base height is the lowest point in the stand was there is sufficient available fuel to propagate fire vertically. 
\(^{23}\) Canopy bulk density is the canopy weight for a given volume.
Prior to European settlement, dry forests of the Inland northwest, ponderosa pine and mixed conifer (grand fir and Douglas-fir), were burned by relatively frequent low and mixed severity fires (Hessburg et al., 2005). The low severity fires occurred frequently, usually every 1 to 25 years, and as a result less than 20 percent of the tree basal area was killed (Agee 2004). The mixed severity fires occurred every 25-100 years and 20 to 70 percent of the basal area may have been fire killed, but in the context of drier fire regime 3 eco classes, such as Douglas-fir/ninebark, this mortality tended to be at the lower end of this overstory mortality (Hessburg et al., 2005).

In stands with low severity fires, fire-tolerant forest structures were maintained by removing the lower crown classes. These fires carried primarily by surface fuels; consumed litter, duff and downed wood; controlled establishment of fire-intolerant species (such as grand fir) and eliminated ladder fuels; and elevated crown bases by killing the majority of trees in the suppressed and intermediate crown layers (Agee 1994b, Youngblood 2008). This reduced the threat of running crown fires by continually thinning stands, eliminating ladder fuels and elevating crown base heights (Hessburg et al., 2005). Crown fires rarely occurred under these conditions, which can be attributed to lack of surface fuel continuity, raised crown base heights, and reduced crown bulk densities.

### Table 3-10. Fire regimes within Sunrise project area by acres.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11,181</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>9,178</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>5,828</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>5,780</td>
<td>18</td>
</tr>
<tr>
<td>No Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Administration Sites)</td>
<td>22</td>
<td>N/A</td>
</tr>
<tr>
<td>WADNR &amp; WDFW¹</td>
<td>1130</td>
<td>N/A</td>
</tr>
</tbody>
</table>

¹ WADNR and WDFW land was not analyzed for fire regime.
Figure 3-1. Fire Regime Condition class for the Sunrise project area. Note, WADNR and WDFW land was not analyzed for condition class.

Approximately 29 percent of the Sunrise project area is considered to be in condition class 2 and another 15 percent in condition class 3. This indicates a transition to more complex fuel conditions than historically were present in the planning area. Fuels that would have historically been consumed during periodic wildfires have increased and in many areas, surface and aerial (within the canopy) fuel loadings are above historical levels. Table 3-11 groups the project planning area into the 3 condition classes by acres and percent of planning area, and the map above visually displays the condition class of the landscape within the Sunrise planning area.

Table 3-11. Acres by condition class within the Sunrise project area.

<table>
<thead>
<tr>
<th>Condition Class</th>
<th>Acres</th>
<th>Percent of Planning Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11613</td>
<td>35%</td>
</tr>
<tr>
<td>2</td>
<td>9588</td>
<td>29%</td>
</tr>
<tr>
<td>3</td>
<td>5030</td>
<td>15%</td>
</tr>
</tbody>
</table>

A reason for this change in forest composition and structure is due to the decline in fire occurrence caused by changes in land use (Heyerdahl 1997). Fire is thought to be a dominant disturbance type in the Blue Mountains prior to European settlement (Agee 1994a). These fires kept stands from becoming overstocked and ground fuels from accumulating. In the late 1800’s and early 1900’s settlers began moving to the northwest, so began timber harvest, grazing and
the establishment of the Forest Service (Agee 1993). Along with establishment of the Forest Service agency came policy to suppress all wildfires (Agee 1993). Aggressive fire suppression has been the Forest Service policy since the destructive fire season in northern Idaho and western Montana in 1910. By restricting fire spread through suppression, fuels that would have been reduced by wildfire have been allowed to accumulate, increasing the probability of large, more intense fires. Fire suppression has also affected current conditions by substantially decreasing fire mosaics or patches on the landscape. Historically, fires burned large areas creating a landscape consisting of a mixture of succession patterns or mosaics, with some of these patches serving as natural fire barriers. With successful fire suppression, the large-scale fire mosaics or patches on the landscape are being lost, creating a more uniform fuel structure with little or no natural barriers to help contain fire growth. This absence of fire has allowed stands to become overstocked, species composition to change fire-intolerant trees, and ground fuels to accumulate resulting in increased fire severity in forest types that once were adapted to low intensity wildfires.

Historical wildland fire data shows that very small acreages have burned during the last 100 years in the Sunrise project area. With respect to fire return frequency, this means at least two fire return intervals have been missed in fire regime 1 and one or more in fire regime 3 (depending on the classification, example IIIa or IIIc). This absence of fire has resulted in increased surface fuel loads, increased tree density and lower canopy base heights. Increased canopy cover has led to regeneration of shade-tolerant, fire-intolerant species with low crown bases. These abundant small trees serve as ladders that carry fire from the forest floor to the canopy, increasing the likelihood of crown fire (Huff et al. 1995.) Table 3-12 displays wildfire acres in the project area by decade.

<table>
<thead>
<tr>
<th>Decade</th>
<th>Number of Fires</th>
<th>Total Acres Burned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>1</td>
<td>8710</td>
</tr>
<tr>
<td>1970</td>
<td>25</td>
<td>4.3</td>
</tr>
<tr>
<td>1980</td>
<td>31</td>
<td>48.6</td>
</tr>
<tr>
<td>1990</td>
<td>34</td>
<td>1864.5</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td>0.8</td>
</tr>
<tr>
<td>2010 – present</td>
<td>10</td>
<td>152.7</td>
</tr>
</tbody>
</table>

1 There are no fires on record between 1911 and 1969.

Fire exclusion and fire suppression have also indirectly contributed to advancing secondary succession by preventing fires of a size and frequency that allow establishment of early seral species (Hessburg et al., 2005). Tree densities in the Sunrise project are above historical densities in dry upland forestland (see Silviculture report). High tree densities in dry upland forest historically occupied 5 to 15 percent of the area, but currently occupy 79 percent of the dry upland forest area. Historical range of variability analysis for species composition shows that dry forestland currently supports too much of the Douglas-fir forest cover type and too little of the ponderosa pine forest cover type. Historical range of variability analysis also shows moist forestland supports too much of the subalpine fir/spruce and Douglas-fir forest types and too little of the western larch and lodgepole pine forest cover types. In dry upland forest, the HRV for ponderosa pine is 50 to 80 percent cover, Douglas-fir is 5-20 percent, and grand fir is one to 10 percent. Currently ponderosa pine cover type is at 34 percent, Douglas-fir is 52 percent, and grand fir is at 10 percent (see Silviculture report).
For moist upland forest the HRV is 5-15 percent ponderosa pine cover type, 15 to 30 percent Douglas-fir cover type, 10 to 30 percent western larch, 15 to 30 percent grand fir and one to 10 percent spruce-fir. Current percentages are 13 percent ponderosa pine (within HRV), 33 percent Douglas-fir, two percent western larch, 19 percent grand fir and 22 percent spruce-fir (see Silviculture Report).

Acres of the national forest are further described in terms of fuel models. Table 3-11 below explains the most common models found within the project area, while Figure 3-3 visual represents each model’s geographic location within the project area.

**Surface Fuel Loading**

Across the project area, the absence of low and mixed severity fires has caused a substantial increase in surface fuel loading, understory vegetation and stand density. There are areas with high fuel loadings caused by insects and disease, self-thinning and overstory tree mortality. The loss of the fire-resistant large-tree component has reduced the fire resiliency of many stands. Past overstory removal and lack of fire has resulted in a shift from ponderosa pine forest cover type, on dry-forest sites, to Douglas-fir and grand fir. Moist-forest sites have shifted from Douglas-fir, western larch cover types to grand fir, spruce cover types in many stands, significantly increasing ladder fuels and decreasing canopy base height. If a fire occurs in these areas under favorable burning conditions, it is likely that torching and/or crowning would cause overstory mortality.

**Table 3-13. Most common fuel models (Anderson 1982) found in the Sunrise project area.**

<table>
<thead>
<tr>
<th>Fuel Model</th>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Short Grass</td>
<td>Surface fires that move rapidly through the continuous, cured or nearly cured herbaceous fuels. Surface fuel loading, less than 3 inches in diameter, is less than .74 tons per acre. Surface fuel bed depth is 1.0 foot.</td>
</tr>
<tr>
<td>2</td>
<td>Timber, Grass, and understory</td>
<td>Fire spread is primarily through the fine fuels, such as grass and pine needles. The stand is open where larger pine and Douglas-fir cover one to two-thirds of the area. Surface fuel loading, less than 3 inches in diameter, averages 4 tons per acre. Surface fuel bed depth is 1 foot.</td>
</tr>
<tr>
<td>5</td>
<td>Low Brush</td>
<td>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 less intense because surface fuel loads are light. Surface fuel loading, less than 3 inches in diameter, averages 3.5 tons per acre. Surface fuel bed depth is 2.0 feet.</td>
</tr>
<tr>
<td>8</td>
<td>Timber, Closed Timber Litter</td>
<td>A typical stand includes a closed canopy of short-needled conifers, such as Douglas-fir. The compact litter layer consists of needles, leaves and occasional twigs. Surface fuel loading, less than 3 inches in diameter, averages 5 tons per acre. Surface fuel bed depth is 0.2 feet.</td>
</tr>
<tr>
<td>10</td>
<td>Timber, Litter, Understory</td>
<td>Fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Fuels in this model include greater quantities of dead and down material 3 inches and greater. Crowning, spotting and torching are more frequent in this fuel situation. Surface fuel loading, less than 3 inches in diameter, averages 12.0 tons per acre. Surface fuel bed depth is 1.0 feet.</td>
</tr>
</tbody>
</table>

Surface fuel loadings vary throughout the project area and are best described by fuel models. Fuel models contained within the proposed areas are described by Anderson (1982). The difference in fire behavior among fuel models is related to the fuel load and its distribution among the fuel particle size classes (Anderson 1982). Fuel load and depth are significant fuel properties for predicting whether a fire would be ignited, rate of spread and intensity (Anderson 1982). Fuel models do not indicate potential for uncharacteristic wildfire behavior and effects,
fire regime condition class, or departure from historical conditions. However, the combination of an indicator of departure from historical conditions, along with fuel models, can be of considerable value in determining if wildfire behavior and effects have departed from natural conditions (Hann 2003). Intensity and duration of surface fires depend on the availability and condition of surface fuels (Graham 2004). Woody fuel can greatly increase the energy released from surface fires and in some cases increase flame lengths sufficiently to ignite ladder and/or canopy fuels (Graham 2004). In terms of fuels and fire potential, a majority of the closed stands proposed for commercial harvest treatment have fuel loads that are best represented as fuel model 10. Fuel model 5 occurs in the more open stands. Areas proposed for landscape prescribed fire are represented by fuel models 1, 2 and 5 with minor inclusions of fuel models 8 and 10.

Fuel model 2 and 8 are fuel models which would have abundantly existed in fire regime 1 and 3 dominated landscapes. The fire behavior of these representative models (except fuel model 8) is determined by accumulations of fine fuels. Some stands may not have changed enough to move into a different fuel model classification, but fire exclusion and the associated changes in stand condition have significantly increased the fire behavior potential. 3-12 below, contains the relative percentages of fuel models in the Sunrise planning area as they are currently classified. As an example, many of the stands classified as Fuel model 8 are becoming older. As these stands have aged, numerous trees have been out competed for sunlight and nutrients and are now standing dead or have recently fallen, creating higher fuel loads in all fuel size classes. These higher surface fuel loads are more characteristic of a fuel model 10.
In the Sunrise planning area, the changes in forest stands and the concurrent increase in down woody fuel loadings have caused a shift from a historical dominance from fuel models 1 and 2, to fuel model 5, and from fuel model 8 to the dominance of fuel model 10. This could potentially result in a shift of fire behavior during severe fire weather conditions from what were historically fast moving, low intensity, surface fires to fast moving, high intensity crown fires which can be stand replacing.

<table>
<thead>
<tr>
<th>Fuel Model</th>
<th>Acres</th>
<th>Percent of Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9527</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>6414</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>2474</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>1759</td>
<td>5</td>
</tr>
<tr>
<td>10, 11, 12</td>
<td>11793</td>
<td>37</td>
</tr>
<tr>
<td>No Data</td>
<td>22</td>
<td>N/A</td>
</tr>
<tr>
<td>WDFW and WADNR</td>
<td>1130</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1 Fuel Models 11 and 12 where combined with Fuel Model 10 because Fuel Model 10 more accurately resembles down woody fuel. 2 WADNR and WDFW land was not analyzed for fuel model.

Crown Fire Hazard

Under historical disturbance regimes, frequent surface fires consumed litter, duff, and down wood; controlled establishment of fire intolerant species; reduced density of small diameter stems; opened the stands to increased sunlight; led to vertical stratification of fuels by eliminating fuel ladders between the forest floor and overstory canopy; and maintained early seral plant associations. Crown fires rarely occurred under these historical disturbance regimes. Consequently, the structure in these stands consisted of open, predominantly widely spaced medium to large, old trees, light and patchy ground fuels, and low and patchy cover of fire-tolerant shrubs (Youngblood et al. 2008).

It is estimated that with a properly functioning disturbance regime, influenced primarily by frequent surface fire (Agee, 1998), dry forest had 60 percent of its acreage supporting low-density forest, 30 percent supporting moderate-density forest and 10 percent supporting high-density forest (Powel, 2009). As for mixed severity fire, moist forest had 30 percent supporting low-density, 50 percent moderate density and 20 percent high density (Powell 2009).

Currently in the Sunrise planning area, 79 percent of the dry upland forest acres are classified as high tree density, 14 percent moderate and 6 percent low. Historically, 5 - 15 percent of dry upland forest would have been high tree density and 40 - 85 percent classified low. For moist upland forest 72 percent is currently in the high tree density category, 20 percent in the moderate class, and 8 in the low. Historically, 15 - 30 percent of moist upland forest would have been high tree density and 20 to 40 percent classified low (see Silviculture report).

Crown fire hazard in the Sunrise project area was calculated based upon the potential for individual stands to support a fire moving from the ground into the crowns of the trees, initiating and sustaining a crown fire. The Forest Vegetation Simulator Fire and Fuels Extension
(FVS/FFE) utilizes a torching index\textsuperscript{24} and a crowning index\textsuperscript{25} to calculate crown fire hazard and summarizes the potential into four categories surface fire, passive crown fire, active crown fire and conditional crown fire. Surface fire does not burn in the crowns, passive crown fires would burn as individual trees or groups or groups of trees torch and active crown fires move through the tree crowns, burning all crowns in the stand (Rebain et al. 2015.) Conditional crown fires are fires that if beginning as surface fire would remain a surface fire, but beginning as an active crown fire in an adjacent stand may continue to spread as an active crown fire. Crown fire hazard for the Sunrise project area is displayed in Figure 3-4 below. Roughly 34 percent of the dry and moist forest types in the Sunrise project planning area are classified as having active or passive crown fire hazard (see Table 3-15 below).

\begin{table}[!h]
\centering
\caption{Crown fire hazard by Fire Regime within the Sunrise project area\textsuperscript{26}.}
\begin{tabular}{|l|c|c|c|c|c|}
\hline
Crown Fire Potential & Fire Regime 1 (Acres) & Percent of Planning Area (FS Only) & Fire Regime 3 (Acres) & Percent of Planning Area (FS Only) & Fire Regime 4 (Acres) & Percent of Planning Area (FS Only) \\
\hline
Surface Fire & 4,011 & 13\% & 1,452 & 4\% & 1,515 & 5\% \\
Passive Crown Fire & 3,388 & 11\% & 1,269 & 4\% & 2,802 & 9\% \\
Conditional Crown Fire & 458 & 1\% & 279 & 1\% & 501 & 1\% \\
Active Crown Fire & 3,213 & 10\% & 2,829 & 9\% & 959 & 3\% \\
\hline
11,175 & 35\% & 5,828 & 19\% & 5,778 & 19\% \\
\hline
\end{tabular}
\end{table}

\textsuperscript{24} Torching index is the 20 foot wind speed required at which a surface fire is expected to ignite the crown layer (Rebain, et. al., 48).

\textsuperscript{25} Crowning index is the 20 foot wind speed needed to support an active or running crown fire (Rebain, et. al., 48).

\textsuperscript{26} Fire Type was not calculated for 9163 acres of Fire Regime 2, 22 acres of administrative sites and 2 acres of no data equaling 29\% of planning area (FS acres only).
Environmental Consequences

Direct and Indirect Effects

*Alternative A (No Action)*

Taking no action in the analysis area would allow Fire Regimes (FR) to continue outside their historical range of variability (HRV), as reflected by their condition classes, and further deviation from HRV would occur across the landscape. In the dry upland forests as described in Hessburg et al. (2005), fire severity, intensity, frequency, and vegetative characteristics would continue to place ecosystem function at risk in the event of an uncharacteristic wildfire (Barrett et al. 2010).

In the absence of treatment in the Sunrise project area, fire regimes 1 and 3 would continue to shift from frequent low/mixed severity fires to infrequent moderate/high severity fires characterized by increased fire return intervals and associated fire disturbance severities. The area would continue to develop dense, multi-storied stands with forest composition continuing to shift towards fire intolerant species dominance (Powell 2009). Insects and disease would act as a surrogate to the historical fire disturbance, and the relative distribution of low, moderate, and high severity disturbance would continue to be outside HRV across the landscape.
Vegetation characteristics associated with condition classes would continue to depart under the No Action alternative. FRCC 1 represents the historical state of the landscape by definition and currently characterizes less than 35 percent of the planning area. This means that 65% of the landscape has experienced some degree of departure from its historical condition.

Taking no action in the Sunrise planning area would result in species compositions that remain outside the historical range of variability. In the dry upland forests, ponderosa pine cover type would continue to be underrepresented, and on moist-forest sites western larch and associated species would also be underrepresented.

No change would occur to tree density levels, so the low density condition would continue to be under represented on dry forest sites, as well as canopy biomass levels for both dry and moist forest-types.

**Fuel Loading**

Fuel loading would remain high and continue to increase. Standing dead fuel (snags) would continue to accumulate and add to the existing down fuel load leading to increased departure in FRCC and HRV.

**Crown Fire Hazard**

Under the No Action alternative 34 percent of the dry (fire regime 1) and moist (fire regime 3) forest areas in the Sunrise analysis area would continue to be at risk of historically uncharacteristic crown fire. Crown fire is dependent upon stand structure, composition, density, and fuel loading. In the absence of treatment, the Sunrise analysis area would continue to depart from historical conditions in all of the listed characteristics that contribute to the initiation of crown fire. Structure would remain multi-storied where it occurs and develop in areas not currently exhibiting multi-storied canopies. Density would increase in most areas under the No Action alternative creating the ability of fire to spread from crown to crown. Fire intolerant species would be allowed to occupy a more dominant role in the forested stands leading to physical characteristics that increase torching and the ability to initiate and sustain crown fire. Accumulating surface and aerial fuels would increase fire intensity which is a major component driving initiation of crown fire.

**Alternative B**

Alternative B would include a mix of treatments including 5,520 acres of timber harvest; 1,068 acres of associated mechanical grapple piling; 878 acres of associated activity fuels prescribed burning; 585 acres of mechanical and 1,677 acres of hand non-commercial mechanical thinning and ladder fuel reduction; and 14,055 acres of landscape prescribed burning.

Thinning treatments are designed to reduce stocking levels and stand densities while altering species composition to favor fire-tolerant and insect and disease resistant species.

**Fire Regime Condition Class**

Alternative B addresses the need to shift FRCC 2 and 3 acres towards FRCC 1 in fire regimes 1, 2 and 3. Table 3-16 summarizes the existing FRCC within the Sunrise project area.
Table 3-16. Existing fire regime condition class in the Sunrise project area.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Condition Class</th>
<th>Acres</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4,903</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5,247</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>917</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5,093</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4,113</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1,617</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4,341</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3-16 summarized the post-treatment condition class by FRCC. This analysis is based on the definition of fire regime 1 representing HRV for all dry upland forest types described by Hessburg et al. (Date). Fire regime 3 represents a mix of both moist and cold upland forest types and ranges from mixed conifer, dry Douglas-fir and dry grand fir to mesic grand fir and Douglas-fir cover types. Overall, Alternative B would move approximately 19% (5,986) of upland forest towards a more resilient and historically appropriate condition. Alternative B would also treat 447 acres of condition class 2 in fire regime 2.

Table 3-17. Fire regime condition class post treatment for Alternative B.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Condition Class</th>
<th>Existing Acres</th>
<th>Alt. B Post Treatment Acres</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4,903</td>
<td>7,824</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5,247</td>
<td>2,709</td>
<td>-48</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>917</td>
<td>534</td>
<td>-42</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5,093</td>
<td>5,357</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4,113</td>
<td>3,631</td>
<td>-10%</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1,617</td>
<td>4,459</td>
<td>179%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4,341</td>
<td>1,377</td>
<td>-68%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Percentages are calculated based on 31,989 Forest Service acres within the planning area. Condition class was not calculated for Washington Department of Fish and Wildlife lands or Washington State Department of Natural Resources land. Acres were not double counted for post treatment effectiveness. For example, if 24 acres of a cutting unit intersected with landscape prescribed fire, the 24 acres were only counted once in post treatment (Table 3-17.)

**Reduction in Crown Fire Hazard**

The fuels and vegetative structure that initiates and spreads crown fire would be changed under Alternative B. The treatments would increase height to live crown, reduce surface fuel loading, shift the landscape towards fire adapted species, and reduce canopy bulk density in the treated areas. Commercial harvest and subsequent fuels treatments would significantly reduce the crown fire hazard by decreasing stem and crown densities, and reducing surface fuel loadings. Ladder fuels are significantly reduced through timber harvest and non-commercial thinning followed by underburning or grapple piling.
In dry upland forests, under the 75th percentile weather scenario, Alternative B treatments would treat approximately 2,859 acres of dry forest (fire regime 1) in the passive and crown fire category. Under the 95th percentile weather scenario 3994 acres of the dry forest would be treated in the passive and/or active crown fire categories. In moist upland forests (fire regime 3), under the 75th percentile weather scenario, 1,398 acres would be treated in the passive and/or active fire categories and under 95th percentile weather, 2,858 acres would be treated. Table 3-18 summarizes the change in abundance of crown fire potential for fire regimes 1 and 3 under Alternative B.

<table>
<thead>
<tr>
<th>Percentile Weather</th>
<th>Fire Regime</th>
<th>Crown Fire Hazard</th>
<th>Existing Acres</th>
<th>Acres Treated</th>
<th>Percent Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>1</td>
<td>Surface</td>
<td>6,590</td>
<td>3,896</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,424</td>
<td>2,445</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>1,063</td>
<td>414</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Surface</td>
<td>3,289</td>
<td>2,670</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>2,049</td>
<td>1,038</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>490</td>
<td>360</td>
<td>73</td>
</tr>
<tr>
<td>95</td>
<td>1</td>
<td>Surface</td>
<td>4014</td>
<td>2,561</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,390</td>
<td>2,645</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>3,214</td>
<td>1,349</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Surface</td>
<td>1,452</td>
<td>1,043</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>1,269</td>
<td>851</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>2,829</td>
<td>2,007</td>
<td>71</td>
</tr>
</tbody>
</table>

1 Percent treated = acres treated divided by existing acres. For example 59 percent treated for percentile weather of 75, fire regime 1, surface fire simply means that 59 percent of existing 6,590 acres of surface fire is proposed for treatment.

The indirect effects of the action alternatives would be negligible. In the future, if there is no further action, it is anticipated the Fire Regime Condition Class and Crown Fire Potential will move toward where they are at present.

**Alternative C**

Alternative C would include a mix of treatments including 4830 acres of timber harvest; 329 acres of associated grapple piling and 2,730 acres of jackpot burning of activity fuels; 593 acres mechanical and 1,676 acres of hand non-commercial thinning and ladder fuel reduction; and approximately 14,000 acres of landscape prescribed burning.

Thinning treatments are designed to reduce stocking levels and stand densities while altering species composition to favor fire tolerant and insect and disease resistant species.
Fire Regime Condition Class (FRCC)

Alternative C addresses the need to shift from condition classes 2 and 3 acres towards condition class 1.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Condition Class</th>
<th>Existing Acres</th>
<th>Alt. C Post-Treatment Acres</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4,949</td>
<td>7557</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5,237</td>
<td>2934</td>
<td>-44</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>903</td>
<td>575</td>
<td>-37</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4,952</td>
<td>5535</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4,036</td>
<td>3671</td>
<td>-11</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1,597</td>
<td>4094</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4239</td>
<td>1864</td>
<td>-57</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3-19 summarizes the post-treatment condition class by FRCC. This analysis is based on the definition of fire regime 1 representing HRV for all dry upland forest types described by Hessburg et al. 2005. Fire regime 3 represents a mix of both moist and cold upland forest types and ranges from mixed conifer, dry Douglas-fir and dry grand fir to mesic grand fir and Douglas-fir cover types. Overall, Alternative C would move approximately 16% (5,131 acres) of upland forest towards a more resilient and historically appropriate condition. Alternative C would also treat approximately 442 acres of condition class 3 in fire regime 2.

Reduction in Crown Fire Potential

In dry upland forests, under the 75th percentile weather scenario, Alternative C treatments would move approximately 2,570 acres of dry forest (fire regime 1) from passive or active crown fire categories to the surface fire category. Under the 95th percentile weather scenario 3,673 acres of the dry forest would be treated in the passive and/or active crown fire categories. In moist upland forests (fire regime 3), under the 75th percentile weather scenario, 989 acres would be treated in the passive and/or active crown fire categories and under 95th percentile weather, 1592 acres would be treated. Table 3-20 summarizes the change in abundance of crown fire potential in moist upland forest under Alternative C.

<table>
<thead>
<tr>
<th>Percentile Weather</th>
<th>Fire Regime</th>
<th>Crown Fire Hazard</th>
<th>Existing Acres</th>
<th>Alt. C Post Treatment Acres</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>1</td>
<td>Surface</td>
<td>6,590</td>
<td>3,782</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,424</td>
<td>2,219</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>1,063</td>
<td>369</td>
<td>35%</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Surface</td>
<td>3,289</td>
<td>2,299</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>2,049</td>
<td>646</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>490</td>
<td>343</td>
<td>70%</td>
</tr>
<tr>
<td>Percentile Weather</td>
<td>Fire Regime</td>
<td>Crown Fire Hazard</td>
<td>Existing Acres</td>
<td>Alt. C Post Treatment Acres</td>
<td>Percent Change</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>----------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>95</td>
<td>1</td>
<td>Surface</td>
<td>4,014</td>
<td>2,478</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,390</td>
<td>2,448</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>3,214</td>
<td>1,244</td>
<td>39%</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Surface</td>
<td>1,452</td>
<td>761</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>1,269</td>
<td>677</td>
<td>53%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>2,829</td>
<td>1,689</td>
<td>60%</td>
</tr>
</tbody>
</table>

In relation to indirect effects, it is believed that the indirect effects of the action alternatives would be negligible. In the future, if there is no further action, it is anticipated the Fire Regime Condition Class and Crown Fire Potential will move toward where they are at present.

**Mitigation Measures**

The Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484) provides standardized procedures specifically associated with planning an implementation of prescribed fire. Prior to implementing prescribed fire under the standards in the PMS 484, there must be compliance with the National Environment Policy Act (NEPA), National Historical Preservation Act (NHPA) and Endangered Species Act (ESA) requirements. PMS 484 describes what is minimally acceptable for prescribe fire planning and implementation and is documented, reviewed and signed in a Prescribed Fire Burn Plan.

**Cumulative Effects**

Activities considered for cumulative effects are those that further modify indicators used in this analysis. The indicators utilized to measure changes in conditions for this analysis are fire regime condition Class, associated HRV, and crown fire potential. Past actions were considered and addressed in the current conditions section of this document. For an activity to be considered a cumulative effect they must overlap in space and time with proposed treatments. The following reasonably foreseeable activities are recognized as having potential cumulative effects relating to fuels activities outlined in direct and indirect effects portion of this analysis. All activities listed below are expected to occur within the same time frame as implementation of the Sunrise project and are located within the project planning area. The same analysis area (Sunrise project planning area) used to analyze direct and indirect effects above are used in the cumulative effects analysis because effects are not expected to move outside the project planning area.

**Alternative A (No Action)**

Because no direct or indirect effects would occur with implementing Alternative A, there are no cumulative effects.

**Alternatives B and C**

**Asotin Prescribed Fire Project**

Asotin Prescribed Fire project would treat 7,957 acres of Forest Service land within the Sunrise project planning area with prescribed fire. The objective of the Asotin Prescribed Fire project is to maintain, or reestablish, vegetation characteristics and disturbance regimes associated with fire regimes of the Blue Mountains, and improve the health and resiliency of native grasses and shrubs to improve wildlife forage in big game winter range and bighorn sheep habitat.
The Asotin Creek prescribed fire projects would contribute to the reduction of stands in condition class 2 and 3 in fire regimes 1, 2 and 3, and would reduce acres of passive and active crown fire. Table 3-21 and Table 3-22 display the amount of acres that would be effected in fire regimes 1, 2 and 3 in condition classes 2 and 3, and crown fire potential categories low, moderate and high. These effected acres are in addition to acres listed above in the effects analysis.

### Table 3-21. Fire regime condition class post treatment for Asotin Creek prescribed fire project.

<table>
<thead>
<tr>
<th>Fire Regime</th>
<th>Condition Class</th>
<th>Existing Acres</th>
<th>Asotin Post Treatment Acres</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4,949</td>
<td>6,181</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5,237</td>
<td>4,412</td>
<td>-16%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>902</td>
<td>495</td>
<td>-45%</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4,952</td>
<td>8023</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4,036</td>
<td>965</td>
<td>-76%</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1,597</td>
<td>1,620</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4,239</td>
<td>4,216</td>
<td>-0.05%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 3-22. Change in distribution of crown fire potential in dry upland forests as a result of Asotin Creek prescribed fire.

<table>
<thead>
<tr>
<th>Percentile Weather</th>
<th>Fire Regime</th>
<th>Crown Fire Hazard</th>
<th>Existing Acres</th>
<th>Asotin Post Treatment Acres</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>1</td>
<td>Surface</td>
<td>6,590</td>
<td>7,776</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,424</td>
<td>2,752</td>
<td>-20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>1,063</td>
<td>549</td>
<td>-48%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Surface</td>
<td>3,289</td>
<td>3,312</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>2,049</td>
<td>2,027</td>
<td>-1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>490</td>
<td>489</td>
<td>0%</td>
</tr>
<tr>
<td>95</td>
<td>1</td>
<td>Surface</td>
<td>4,014</td>
<td>6,051</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>3,390</td>
<td>2,751</td>
<td>-19%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>3,214</td>
<td>1,726</td>
<td>-46%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Surface</td>
<td>1,452</td>
<td>1475</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passive</td>
<td>1,269</td>
<td>1,248</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active</td>
<td>2,829</td>
<td>2,828</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irrevocable commitment of resources with implementation of proposed activities.

### 3.8 Wildlife Species and Habitat

This section incorporates by reference the Sunrise Wildlife Specialist Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies,
assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

The Sunrise project would change the distribution and amounts of various types of wildlife habitat in the area. Habitat conditions and species status in the area are described, as well as changes that would be expected. This section includes the Biological evaluation for Threatened, Endangered, Proposed and Sensitive wildlife and invertebrate species.

**Regulatory Framework**


Agency policy direction is provided in the Forest Service Manual (FSM 2670) and the Umatilla National Forest Land and Resource Management Plan (Forest Plan) (USFS 1990). The Forest Plan contains standards and guidelines that must be met for specific Management Areas and wildlife habitats. The Eastside Screens Amendment (USFS 1995) and other direction amends some of the standards contained in the Forest Plan and establishes standards for old growth habitat, snag and down wood densities, and habitat connectivity. The standards and guidelines in the Forest Plan, as amended, apply to the proposed activities contained in this analysis.

**Methodology**

The geographic scale of analysis for most species is the roughly 32,000 acre project area itself because it is large enough to encompass the home range or range for most species considered in this project area. The following exceptions are made:

- Elk habitat is assessed by forest plan management area as described in the elk section, because forest plan standards for elk are specific to each area.
- NFMA viability compliance for management indicator species is determined at the forest scale.
- Habitat for the primary cavity excavator group is assessed at the watershed scale.

Time frames considered for direct, indirect, and cumulative effects to wildlife are short-term (within 10 years), mid-term (10-50 years) and long-term (more than 50 years). These temporal scales are appropriate given the parameters of the proposed activities and the duration of potential effects to all wildlife species addressed in this document. Indirect effects are estimated for 10-50 years into the future because that is a timeframe in which changes in structure, species composition, and density are expected to remain measurable and predictable with a reasonable degree of certainty.

**Information Sources**

The quantity and quality of wildlife habitat and the effects of proposed activities were assessed using the following sources of information:

- Personal knowledge and personal communications with state and other wildlife biologists
- Notes, summaries, and other documents generated from field reconnaissance of the project area
- Publications, reports, and scientific papers
- Layers, data tables, graphics, maps and other information within and/or generated from information stored within the corporate Geographic Information System (GIS) database
Complete and Unavailable Information

The presence or absence of many wildlife and invertebrate species in the project area is unknown. If habitat is present, we assume that the species may be present now or in the near future. Where information is available, it is presented.

Affected Environment

Resource Indicators and Measures

Proposed silviculture treatments could change forest stand structure, composition, and density on a maximum of 7,790 acres. An additional 14,055 acres would be burned in a mosaic fashion, over a period of years. This totals nearly 70 percent of the 32,000 acre project area. Some wildlife species may benefit from these changes while others may not, and there are short term versus long term trade-offs.

The following categories of wildlife or habitats are discussed: elk habitat, old forest structure, Management Indicator Species, threatened, endangered and sensitive wildlife species, and sensitive invertebrate species (Table 3-23). The main issue utilized for alternative development in this EIS reflects several wildlife issues that were brought up during project scoping. Alternative C was developed to respond to the wildlife habitat issue.

<table>
<thead>
<tr>
<th>Resource Element</th>
<th>Resource Indicator</th>
<th>Measure</th>
<th>Used to address issue?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elk habitat</td>
<td>Amount and distribution</td>
<td>Acres</td>
<td>Yes</td>
</tr>
<tr>
<td>Old Forest</td>
<td>Amount and distribution</td>
<td>Acres</td>
<td>Yes</td>
</tr>
<tr>
<td>Source habitat for Management Indicator Species</td>
<td>Amount and distribution</td>
<td>Acres</td>
<td>Yes</td>
</tr>
<tr>
<td>Snag and down wood habitat</td>
<td>Amount and distribution</td>
<td>Acres</td>
<td>Yes</td>
</tr>
<tr>
<td>TES wildlife species</td>
<td>Presence of species or habitat</td>
<td>Determination of effects</td>
<td>No</td>
</tr>
<tr>
<td>Sensitive invertebrate species</td>
<td>Presence of species or habitat</td>
<td>Determination of effects</td>
<td>No</td>
</tr>
</tbody>
</table>

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 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. All of these Management Indicator Species could be present in the project area (Table 3-24.)
Table 3.24. Wildlife management indicator species for the Umatilla National Forest.

<table>
<thead>
<tr>
<th>Species</th>
<th>Habitat Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky Mountain elk</td>
<td>general forest habitat and winter ranges</td>
</tr>
<tr>
<td>American marten</td>
<td>mature and old growth stands at high elevations</td>
</tr>
<tr>
<td>primary cavity excavators</td>
<td>dead/down tree (snag) habitat</td>
</tr>
<tr>
<td>pileated woodpecker</td>
<td>dead/down tree habitat (mixed conifer) in mature and old growth stands</td>
</tr>
<tr>
<td>northern three-toed woodpecker</td>
<td>dead/down tree habitat (lodgepole pine) in mature and old growth stands</td>
</tr>
</tbody>
</table>

Existing Conditions and Environmental Consequences

**Elk Habitat**

Rocky Mountain elk was selected as an indicator species in the Umatilla Forest Plan (FP) to represent general forest habitat and winter ranges for big game. Elk habitat serves as an indicator of the quality and diversity of general forested habitat, the interspersion of cover and forage areas, and security habitat provided by cover and low levels of human activity.

Elk use a variety of habitat types in all successional stages, and patterns of use change both daily and seasonally. Elk are primarily grazing animals, preferring a diet of grasses and forbs, but in winter they turn to browsing the tips of twigs from willow, alder, aspen or other woody vegetation (Csuti et al. 2001). Summer nutrition is extremely important for elk survival into the following year. Summer elk forage consists of a combination of lush forbs, grasses, and shrubs that are high in nutrients and easily digestible. Early summer diets in the Blue Mountains include big huckleberry and snowberry, while elderberry, ninebark, and ocean spray become more important in late summer (Korfhage et al. 1980). Generally, higher elevation wet meadows, springs, and riparian areas in close proximity to forested stands offer these conditions for the longest period. Such areas provide nutritious forage and moist, cool places for bedding and escaping summer heat and insects (ODFW 2003).

The Sunrise project is within the Lick Creek Game Management Unit. Surveys conducted by WDFW in 2017 indicated that there are approximately 650 elk in the Lick Creek Unit (Wik, pers. commun), which is low compared to the previous 5 years. The 8 year average in Lick Creek is about 850 elk and in some years has achieved the management objective of 1,000 elk. The entire Blue Mountain elk population in Washington, however, has been doing well, with total numbers meeting the state objective of 4,950-6,050 elk for the past 7 years (Wik and Vekasy 2016).

**Scale of Analysis for Forest Plan Standards**

The Sunrise project area falls within summer range, winter range, and calving habitat for elk. Forest plan standards for elk are specific to each Management Area (MA). Generally the winter range actually used by elk overlaps our forest plan MA-C3, but not exactly. Summer use and calving areas in this project are mostly in MA-C4 and C8. Forest plan standards for percent cover, HEI, and road density are currently being met in each of the Sunrise project elk analysis areas (Table 3-25). Three management areas are assessed for the Sunrise project:

MA-C4, Wildlife Habitat: designated in the Forest Plan to ‘provide high levels of potential habitat effectiveness for big game and other wildlife species’ (FP 4-158). A mosaic of even-aged and uneven-aged stands dispersed in a manner is desired to create a pattern of forage and cover. Managing roads is emphasized to provide big game security.
MA-C3, Big Game Winter Range: designated to provide high levels of potential habitat effectiveness and high quality forage for big game (FP 4-151). The desired condition is a mosaic of managed forest, brush patches, and large grasslands. Forested areas will contain a mix of harvested even-aged, uneven-aged, and natural stands, creating patterns of cover and forage areas. MA-C3A, Sensitive Big Game Winter Range, is included in the overall winter range analysis because it has the same standards as MA-C3.

MA-C8, Grass-Tree Mosaic: designated to provide (in part) high levels of potential habitat effectiveness and high quality forage for big game (FP 4-171). Desired condition is natural appearing patches or stringers of timber on open steep hillsides. Stands may be mature multi-layered timber or more open as the result of management designed to improve big game habitat. The MA-C8 in the Sunrise project is roadless and relatively unmanaged.

Three forest plan standards are used to evaluate effects of management actions on elk habitat: percent tree cover, open road density, and habitat effectiveness. The Habitat Effectiveness Index (HEI) model combines the amount of elk cover, the ratio and configuration of cover and forage areas, and open road density to provide an index value. Elk forage is also discussed, but there is no forest plan standard.

**Tree Cover**

Forested stands with relatively closed canopies are often used by elk disproportional to their availability and can function as hiding cover or reduce the difference between an animal's body temperature and ambient air temperature. Research from the nearby Starkey Experimental Forest (Cook et al. 1998) and other studies suggest that the presumed thermal benefits of cover could not be substantiated, but recognized that multi-story forested stands are important to elk because of their tendency to use these areas throughout the year.

The Forest Plan defines satisfactory cover as a stand of trees at least 40 feet tall and providing 70 percent or more canopy closure. Marginal cover is defined as a stand of trees at least 10 feet tall and providing 40 percent or more canopy closure. Both types should have sufficient understory structure to obscure 90 percent of a standing elk at a distance of 200 feet. There is no forest plan standard for marginal cover; rather it is added to satisfactory cover for the total cover standard.

MA-C3 is right at the minimum of 30 percent total cover (Table 3-25). No overstory harvest is proposed in this area. Only small diameter tree cutting and prescribed burning is proposed in MA-C3 and C3A.

MA-C4 is 53 percent cover, well above the forest plan minimum of 30%; however, the roadless area is providing much of the cover while the managed areas are lacking. Alternative C addresses this issue.

MA-C8 is well above the minimum forest plan standards for cover. It is roadless and the only recent management in the area has been landscape prescribed fire.

**Roads**

Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less hiding cover (Weber et al. 2000).
All three elk analysis areas have relatively low open road densities and are within the desired condition of an average of 2 miles per square mile or less, forest-wide (FP p. 4-11) (Table 3-25).

MA-C3 has 13 miles of road and about 5 miles of motorcycle trail open in the summer and fall, but roads are gated December 1 for the winter. The main access road (FR 41) opens April 1, but arterial roads are closed until July 1 to limit disturbance to elk calving. The summer open road density is 1.2 miles per square mile.

MA-C4 open road density is 1.2 miles per square mile. Parts of this MA-C4 are within the Asotin Creek Roadless Area.

MA-C8 is completely within the Asotin Creek Roadless Area. Less than 1 mile of road is open in this area for .05 miles per square mile.

### Table 3-25. Percent tree cover, HEI value, and open road density by management area.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Measure</th>
<th>Forest Plan Standard</th>
<th>Existing Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Area C3/C3A (7,070 acres)</td>
<td>Satisfactory Cover</td>
<td>10 %</td>
<td>16 %</td>
</tr>
<tr>
<td></td>
<td>Total Cover</td>
<td>30 %</td>
<td>30 %</td>
</tr>
<tr>
<td></td>
<td>HEI</td>
<td>70</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Management Area C4 (13,425 acres)</td>
<td>Satisfactory Cover</td>
<td>15 %</td>
<td>36 %</td>
</tr>
<tr>
<td></td>
<td>Total Cover</td>
<td>30 %</td>
<td>53 %</td>
</tr>
<tr>
<td></td>
<td>HEI</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Management Area C8 (9,670 acres)</td>
<td>Satisfactory Cover</td>
<td>10 %</td>
<td>18 %</td>
</tr>
<tr>
<td></td>
<td>Total Cover</td>
<td>30 %</td>
<td>33 %</td>
</tr>
<tr>
<td></td>
<td>HEI</td>
<td>70</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>.05</td>
</tr>
</tbody>
</table>

**Habitat Effectiveness Index**

The elk habitat effectiveness index model (HEI) is used to predict the influence of forest management on elk and other big game species. The model uses the distribution of cover and forage areas, cover quality, and road factors to help indicate how effective an area will be in supporting big game (Thomas et al. 1988.) It is intended to be a relative measure of habitat, and does not consider many other factors such as topography, forage quality, weather, predation, and hunting. The HEI model provides an index rating from 0 to 1, with 0 indicating the least effective elk habitat and 1 indicating optimal effective habitat. The index number is multiplied by 100 to get a whole number for comparison purposes.

MA-C3 elk analysis area has an HEI value of 78, which is above forest plan standard of 70 (Table 3-25). The value is high because all roads are closed in the winter, which creates effective habitat during the winter use period.

MA-C4 HEI value is 70, which is above the minimum forest plan standard of 60. Although this value is high, it does not reflect the poor distribution of cover in much of the C4 analysis area. The roadless area has good cover and no open roads, which brings up the overall HEI value.

MA-C8 HEI value is 82, well above the forest plan standard of 70. The high value is due to the
area being roadless and not having previous timber harvest.

Elk Forage

Forage availability can be affected by competition with livestock, invasive plants, and created openings. However, the amount and quality of forage is largely controlled by the year to year weather (Wisdom et al. 2005).

Grazing occurs in primarily winter range (MA-C3) and grass-tree mosaic (MA-C8) management areas on the north half of the project planning area. Active pastures (8,000 acres) include Lick and Charley in the Peola Allotment, and Park/Cook and Hogback in the Asotin Allotment. Monitoring in 2016 indicates that forage utilization is within Forest Plan standards (Project Range Report). These utilization standards were calculated to provide forage for both livestock and big game. Once an area has reached full utilization, livestock must move out in order to reserve remaining forage for big game.

Timber management, grazing, and prescribed fire can all contribute to the spread of invasive plants. Several species of non-native invasive plants are present in the Sunrise project area, including yellow star thistle, spotted knapweed and diffuse knapweed (Invasive Plant Report). Uncontrolled spread of invasive plants can have substantial impacts to elk forage resources (Sheley and Petroff 1999). Fortunately efforts to control invasive plants on the Umatilla forest have prevented widespread reductions of native big game forage species.

Late and Old Forest

A number of species present on the Umatilla National Forest require late and old structure habitat. These species include pileated woodpecker, white-headed woodpecker, Lewis’ woodpecker, pine marten, northern goshawk, Cooper’s hawk, sharp-shinned hawk, flammulated owl, great gray owl, Vaux’s swift, Townsend’s warbler, Hammond’s flycatcher, and others.

The Forest Plan allocated specific areas as Management Area C1-Dedicated Old Growth to provide old growth forest habitat across the Forest. No timber harvest is allowed in these areas. Four dedicated old growth stands are designated within the project boundary, totaling 1,785 acres (Figure 4). All are on steep hillsides along Asotin Creek. These areas are large compared to most dedicated old growth stands on the forest, the largest of which was designated as a replacement for MA-C1 that was burned in the School Fire.

In addition, the Eastside Screens (USFS 1995) were implemented to preserve options for long term ecosystem strategies that would maintain habitat for species dependent on late and old forest structure. Harvest in late and old structure stands is restricted in some cases, and stands connecting them are given special consideration to prevent short term habitat fragmentation. The Eastside Screens also establish desired conditions for snags and down wood, and protection for goshawk nesting areas.

An analysis of stand conditions in the Sunrise project area was completed to determine the amount and distribution of old forest structure (Silviculture Report). Old forest structure is generally wide spread and well connected in the project planning area (Table 3-26), totaling 13,200 acres or 57 percent of the forested acres.

While only structure is considered for the purposes of identifying old forest, a number of other factors actually affect the quality and effectiveness of these stands for providing habitat for associated wildlife species. In addition to large diameter trees, old growth habitat would consist
of large diameter snags and downed wood, stand complexity/heterogeneity, and trees with broken tops, decay/hollows, wind/ice/fire damage, mistletoe brooms, and other features indicative of decadence. These elements were not evaluated in most of these stands.

The total amounts of old forest are within the ranges of variation for each biophysical environment, but the amount of old forest single stratum is far below and the amount of old forest multi strata is far above the reference condition for both moist and dry forest (Table 3-26). Therefore Scenario A of the Eastside Screens was applied such that no net decrease in old forest would occur from timber removal activity. Harvest is allowed in old forest but only to maintain or enhance late and old structure habitat within a particular biophysical environment, or to move one type of late old structure habitat into another that is deficit (OFMS to OFSS). No trees greater than or equal to 21 inches in diameter at breast height (DBH) would be cut, under any action alternative.

<table>
<thead>
<tr>
<th>Potential Vegetation Group</th>
<th>Old Forest Multi-strata %</th>
<th>Old Forest Single-stratum %</th>
<th>Total Old Forest Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range of Variation</td>
<td>Current</td>
<td>Range of Variation</td>
</tr>
<tr>
<td>Dry</td>
<td>1-15</td>
<td>59</td>
<td>40-65</td>
</tr>
<tr>
<td>Moist</td>
<td>15-20</td>
<td>52</td>
<td>10-20</td>
</tr>
<tr>
<td>Cold</td>
<td>10-25</td>
<td>27</td>
<td>5-20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Douglas-fir and ponderosa pine cover types dominate the northern two thirds of the project planning area. At higher elevations on the southwest part of the project area, grand fir and subalpine fir are prominent.

The largest component of old forest is in the Douglas-fir cover type (7,900 acres), followed by grand fir (2,285 acres) and ponderosa pine (2,225 acres). Douglas-fir is considered ‘overrepresented’ compared to the range of variation for the Umatilla forest (Powell 2014), but provides the majority of old forest in this project area.

Single stratum old forest in the ponderosa pine cover type is rare, occurring in a handful of widely scattered stands (320 acres). This is due to past harvest and fire suppression.

<table>
<thead>
<tr>
<th>Cover Type</th>
<th>OFMS</th>
<th>OFSS</th>
<th>Total Old Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Douglas-fir</td>
<td>7,190</td>
<td>540</td>
<td>7,730</td>
</tr>
<tr>
<td>Grand fir</td>
<td>2,270</td>
<td>0</td>
<td>2,270</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>1,805</td>
<td>320</td>
<td>2,125</td>
</tr>
<tr>
<td>Subalpine fir/other</td>
<td>760</td>
<td>30</td>
<td>790</td>
</tr>
<tr>
<td>Total</td>
<td>12,025</td>
<td>890</td>
<td>12,915</td>
</tr>
</tbody>
</table>

**American Marten**

The American marten (*Martes americana*) was selected as a Management Indicator Species in the Forest Plan to represent mature and old growth stands at high elevations.
In Oregon, American marten occur in the southern Oregon Coast Range, Siskiyou Mountains, Cascade Mountains, and Blue Mountains (Marcot et al. 2003). The global conservation status of marten is considered ‘widespread, abundant, and secure’ (NatureServe 2015).

A study in northeastern Oregon showed that martens selected for areas with denser canopy, more canopy layers, larger diameter live and dead trees, larger down logs, and closer proximity to water as compared to what was available in the area (Bull et al. 2005).

Marten use a variety of structures for rest and den sites, such as tree cavities, mistletoe brooms, and accumulations of down logs (Bull and Heater 2000). Bull et al. (2005) found density of potential rest sites was significantly higher in marten home ranges than in unoccupied areas.

In a comparison of historical versus current conditions in the Blue Mountains, marten habitat appears to be strongly increasing (Wisdom et al. 2000). Suitable environments for marten are broadly distributed and of high abundance on the Umatilla National Forest, and there has been little change from historical to current conditions (Wales et al. 2011). The Umatilla National Forest provides roughly 100,000 acres of marten source habitat, according to forest plan revision data. Source habitat is defined as those habitats contributing to long-term population persistence (Wisdom et al. 2000).

Recent vegetation data was used to determine the current amount and distribution of marten habitat in the project area. The project area provides about 6,225 acres of well-distributed marten habitat, generally associated with the headwaters of Asotin Creek.

A study in Eastern Oregon indicated that the average home range size for males was about 6,700 acres, and the average for females was about 3,500 acres (Bull and Heater 2001). Home ranges typically include both source habitat as well as foraging areas and non-habitat. The authors suggest that a marten reproductive pair would likely have higher success where an average of 6,700 acres are available for foraging and denning. Although no marten observations have been recorded in this area, it is possible that the area could support a reproducing pair of marten.

According to the HRV analysis, old forest multi-strata is overrepresented compared to the range of variability in the Blue Mountains. The area is probably not capable of maintaining this amount of marten habitat over the long term. Considering there are 5,150 acres of existing moist old forest multi-strata, and 1,500-2,000 being the ‘desired range’ for long term sustainability, it follows that the area should have about half as much structurally diverse marten source habitat (OFMS) as is currently being provided. Dead and Down Tree Habitat

Primary cavity excavators as a group were selected to represent dead/down tree (snag) habitat that a wide array of species depend on for reproduction and/or foraging. Primary cavity excavators (PCE) create holes for nesting or roosting in live, dead or decaying trees. Secondary cavity users such as owls, bluebirds, and flying squirrels may use these cavities later for denning, roosting, and nesting.

Populations of cavity nesting birds may have declined across the Blue Mountains compared to historical conditions, primarily due to reductions in the numbers of large snags (Wisdom et al. 2000). However, breeding bird surveys since 1966 indicate a stable, increase, or positive population trend for most of the PCE species in Oregon (Sauer et al. 2014). Partners in Flight (PIF) data indicate that some species may be ‘of concern.’ Lewis woodpecker and white-headed woodpecker have the highest concern PIF scores of all PCEs, and both are listed on our Regional
Forester’s Sensitive species list. They are addressed specifically later in this document (see TES wildlife section).

Additional information on cavity-excavating birds’ habitat associations, distribution and life history requirements is summarized in Mellen-McLean (2012a). Habitat for primary cavity excavators includes coniferous and hardwood stands in a variety of structural stages and the availability of dead trees in various size and decay classes (Thomas et al. 1979). Primary habitat generally contains snags greater than 15 inches DBH, while smaller sizes provide secondary habitat.

Because dead and down tree habitat was selected to represent primary cavity excavators, this analysis and discussion focuses primarily on that habitat component. While maintaining snags and down wood in managed areas contributes to providing habitat for cavity excavators, habitat for each woodpecker species is more than just dead wood, and different for each species. Snag availability is the most limiting factor because that is where reproduction occurs.

**Treatment unit standard**

The Sunrise project snag recommendation exceeds the minimum required by the Forest Plan by requiring retention of all snags > 20 inches dbh, except for hazard trees. If there are less than 3 large snags per acre available, smaller snags would be retained to meet at least 3 per acre at a minimum. Actual snag density would most likely be much higher since all large snags would be retained wherever possible. In addition to snag retention in harvest units, design criteria for snag replacement trees and down wood is provided (see Ch. 2 Design Criteria).

**Dead and Down Wood Analysis**

**Historic Range of Variability**

Integration of the latest science is incorporated into this analysis using DecAID Advisor (version 2.2) (Mellen-McLean et al. 2012) which 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.

Project area contribution to the forest wide viability of primary cavity excavators (PCE) is 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. 2003). By managing habitat within HRV it is assumed that adequate habitat would be provided because species survived those levels of habitat in the past to be present today. Thus, if we manage current habitats within the range of historic variability, we are likely to do an adequate job of maintaining population viability for those species that remain. Generally the further current habitat conditions are from HRV, the more likely it is that population viability would be compromised.

**Reference conditions**

USFS Region 6 Continuous Vegetation Surveys (CVS) are permanent plots on a 1.7-mile grid that sample the vegetative condition on Forest Service land (Brown 2003). DecAID contains snag information from this data source by watershed and by habitat types. CVS data collected
from plots that fell within unharvested areas of the Blue Mountains is used as a reference condition. Data for the small/medium, large, and open structure classes was weighted to best reflect HRV conditions on the Umatilla Forest as determined by the Forest Silviculturist (Powell 2014). Although the data from unharvested areas may not accurately reflect “pre-settlement” or “natural” conditions in eastside forests due to years of fire exclusion (Mellen-McLean et al. 2012), it is comparable to other estimates of historical dead wood densities (Harrod et al. 1998, Agee 2002, Ohmann and Waddell 2002).

Current levels of dead wood may be elevated above historical conditions in some areas 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, the CVS reference data are used in this analysis because: they are still 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).

Current snag and down wood habitat for the Sunrise project was evaluated using the 2012 Gradient Nearest Neighbor (GNN) vegetation data (Ohmann and Gregory 2002). GNN produces pixel-based maps with associated snag and down wood data. In addition, this data was updated with snags identified by aerial detection surveys from 2013 through 2016.

GNN snag and down wood data is organized by watershed and habitat type. The Sunrise project is entirely within the George Creek-Asotin Creek Watershed. The portion of the watershed that lies within the National Forest boundary is approximately 63,155 acres (Figure 3-9). Of the forested area, only the Eastside Mixed Conifer East Cascades/Blue Mountains (EMC/ECB) wildlife habitat type (WHT) (Mellen-McLean et al. 2012) had sufficient acreage to analyze (41,220 acres).

**Snags**

Snag data was weighted by structure type to result in one number that reflects the proportion of data within each type (large, open, and small/medium) for the entire snag analysis area. A distribution analysis was used to determine how close current conditions for snags on the landscape match reference conditions. For a comparison of approximated existing snag density distributions in the Sunrise snag analysis area to reference conditions see the Wildlife Report.

Updates to the 2012 GNN data within the snag analysis area included aerial detection surveys conducted between 2013 and 2016 to estimate impacts of insects and disease and the Little Butte prescribed fire. The aerial detection surveys detected approximately 1,660 acres of low density large snags and small snags. The Little Butte prescribed fire was implemented in September 2016 with approximately 775 acres burned and about 1% of the burn area resulted in snag creation.

Generally, there is a relatively good distribution of snag densities in the Sunrise snag analysis area and densities are fairly consistent with reference conditions for both > 10 and > 20 inch dbh snags. There is a slight deficiency in larger snags in the 4-6 snags/acre density class and a slight abundance of larger snags in the 0-2 snags/acre density class.
Snag densities are at or above the 30%, 50%, and 80% tolerance levels for several primary cavity excavator species (gray area in Table 3-28). Although not meeting all of the highest tolerance levels (unshaded blocks), areas of high snag density habitat are available within the George Creek-Asotin Creek Watershed and across the landscape. In addition, not meeting each level does not indicate that the species would not be present. A 50% tolerance level means that 50% of the woodpecker observations were in those snag densities. Therefore 50% were also observed in study areas with higher or lower snag densities.

Snag densities are meeting the 80% tolerance level for white-headed woodpecker, pygmy nuthatch, and black-backed woodpecker. Recent fires outside of the project area are also providing post-fire habitat for black-backed woodpeckers.

Pileated woodpecker and Williamson’s sapsucker generally use areas with high snag densities. While this condition may be more limited, areas of higher snag density (>12 per acre) occur on 38 percent of the snag analysis areas. For snags greater than 20 inches dbh, habitat for Williamson’s sapsucker and pileated woodpecker meet both the 30% and 50% tolerance levels on about 20 percent of the snag analysis area (> 4 snags per acre).

Many observations of pileated woodpeckers have been recorded over the years throughout the project area and in adjacent areas. Williamson’s sapsucker have also been documented.

Table 3-28. Tolerance levels for woodpeckers occurring in Eastside Mixed Conifer/Blue Mountains habitat type (DecAID Table EMC_S/L.SP-22) Snag density/acre for 30%, 50%, 80% tolerance levels.†

<table>
<thead>
<tr>
<th>Species</th>
<th>&gt;10&quot; dbh</th>
<th>&gt;20&quot; dbh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerance level</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>White-headed woodpecker</td>
<td>0.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Pygmy nuthatch</td>
<td>1.1</td>
<td>5.6</td>
</tr>
<tr>
<td>Black-backed woodpecker</td>
<td>2.5</td>
<td>13.6</td>
</tr>
<tr>
<td>Williamson’s sapsucker</td>
<td>14.0</td>
<td>28.4</td>
</tr>
<tr>
<td>Pileated woodpecker</td>
<td>14.9</td>
<td>30.1</td>
</tr>
</tbody>
</table>

†A tolerance level is an estimate of percent of individuals in a population that use a particular range of values. 50% tolerance means that studies showed 50% of sites used by the species were in areas with that snag density. Gray shading indicates levels in the Sunrise snag analysis area are at or above Blue Mountains reference values.

**Down wood**

A distribution analysis was used to determine how close current conditions for down wood on the landscape match reference conditions. Figures 8 and 9 are a comparison of approximated existing percent cover of down wood in the Sunrise snag analysis area to reference conditions. As snags fall down, more down wood is created. The analysis did not include fall down rates of snags after 2012. Only a slight increase of down wood between 2012 and the present would be expected and the change would not be significant in this analysis.

Generally, there is a relatively good distribution of down wood in the Sunrise snag analysis area. Small diameter (>5 inches) down wood is mostly in excess of reference conditions (Figure 3-10). Large diameter (>20 inches) down wood is fairly consistent with reference conditions, with some variation (Figure 3-11). The amount of the analysis area with more than 2 percent cover is less than reference conditions, which indicates there is a slight deficiency of large diameter down wood in these cover classes. The >2 percent class reference is 10 percent of the area, and the current condition is about 5 percent of the area, so it is small in proportion to the entire analysis area.
Figure 3-4. Distribution of percent cover of down wood > 5 inches diameter in moist upland forest in the snag analysis area (41,220 acres).

Figure 3-5. Distribution of percent cover of down wood >20 inches diameter in moist upland forest in the snag analysis area (41,220 acres). Pileated Woodpecker
The pileated woodpecker (*Dryocopus pileatus*) is an MIS for old growth habitats. Below is a summary of pileated woodpecker ecology important to providing information pertinent to assessing impact of the project on the species. For additional details see Mellen-McLean (2012a) in the analysis file. Also see the body of work by Evelyn Bull in the Blue Mountains (Bull 1987, Bull and Holthausen 1993, Bull et al. 1992, Bull et al. 2007) and Nielsen-Pincus and Garton (2007).

Pileated woodpeckers are widely distributed in forested areas of eastern North America, westward across a large swath of forest in Canada, and then southward into Montana, Idaho, Washington, Oregon, and California (NatureServe 2017). The pileated woodpecker is ranked as ‘widespread, abundant, and secure’ globally, and ‘apparently secure’ in Washington (NatureServe 2017). The state of Washington lists pileated woodpecker as a ‘priority species.’ The PIF database (Partners in Flight 2012) indicates an increasing population and expected future ongoing stability.

Pileated woodpeckers are associated with late seral stages of the subalpine, montane, lower montane forests and specifically old forest structure in mixed conifer forests (Wisdom et al. 2000). In the Blue Mountains, densities of nesting pairs of pileated woodpeckers were positively associated with the amount of late structural stage forest and negatively associated with the amount of area with regeneration harvests since 1970 (Bull et al. 2007).

Snags, down logs, and large hollow trees are important habitat components for pileated woodpeckers. Approximately 90 percent of the diet of these birds consists of carpenter ants, which are associated with large standing and down wood. Ponderosa pine, Douglas-fir and western larch were preferred species for foraging substrate (Bull and Holthausen 1993). The woodpeckers also use large, decadent trees and hollow grand fir for roosting (Bull et al. 1992). The majority of roost trees were hollow grand fir infected with Indian paint fungus and large ponderosa pine snags.

Within mixed conifer forest, pileated woodpeckers nested preferentially in ponderosa pine and western larch in northeast Oregon (Bull 1987, Nielsen-Pincus and Garton 2007). Bull and Holthausen (1993) found that density of large snags (> 20 inches dbh) was the best predictor of density of pileated woodpeckers in the Blue Mountains.

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 (>20 inches dbh) have declined from historic to current levels (Wisdom et al. 2000, Korol et al. 2002).

According to 2012 GNN data, snag densities of large snags are providing habitat at the 50% tolerance level for pileated woodpeckers (see Wildlife Report). The 80 % tolerance level is not met, however the density indicated (over 18 large snags per acre) is an unusual condition and would only be expected on two percent of the landscape, or 800 acres. This density is provided on about 400 acres of the snag analysis area (Figure 3-9).

The project area contains approximately 10,300 acres of pileated woodpecker habitat. Mean home range size for paired birds in northeastern Oregon was 1,180 acres (Bull and Holthausen 1993), which would include both reproductive and foraging habitat. Based on habitat distribution, the Sunrise project area could reasonably support eight pair of pileated woodpeckers. Many observations of pileated woodpeckers have been recorded over the years throughout the project area and in adjacent areas.
Dedicated Old Growth areas are generally providing good habitat for pileated woodpecker forest wide. In 1992, biologists surveyed 100 Dedicated Old Growth areas in the Blue Mountains, including 20 on the Umatilla National Forest (NF). All of the areas surveyed on the Umatilla NF (100%) were occupied by pileated woodpecker at that time (Bull and Carter 1993). The current forest management emphasis on retaining large trees and old forest conditions is beneficial to pileated woodpecker.

A viability assessment completed for the forest plan revision effort indicates no viability concern for the pileated woodpecker on the Umatilla National Forest. Suitable environments for pileated woodpecker have declined slightly, but are broadly distributed and of high abundance on the Umatilla National Forest (Wales et al. 2011). The Umatilla National Forest provides roughly 200,000 acres of pileated woodpecker source habitat. Source habitat is defined as those habitats contributing to long-term population persistence (Wisdom et al. 2000). Overall there is little risk to pileated woodpecker viability (Wales et al. 2011).

**Three-toed Woodpecker**

Three-toed woodpecker (*Picoides dorsalis*) was selected as a management indicator species in the Forest Plan to represent dead and down tree habitat in mature and old growth lodgepole pine stands. Their relatively large home range and close association with old-growth conifer forests make them sensitive to forest harvesting and fragmentation (Leonard 2001).


The global status of three-toed woodpecker is ‘secure’ due to its wide distribution (NatureServe 2017), but ‘vulnerable’ in the state of Washington. They are considered vulnerable due to a decline in old forests of lodgepole, subalpine fir, and Engelmann spruce, salvage of dead trees, and fire suppression (Wisdom et al. 2000). However, a trend analysis of habitat for this woodpecker showed an increasing trend in the Interior Columbia Basin (Wisdom et al. 2000).

American three-toed woodpecker are largely restricted to high elevation conifer forests (Wiggins 2004). They appear to prefer disturbed coniferous forests with trees that exhibit thin, flaky bark such as spruce and lodgepole pine. Foraging occurs on a variety of tree species including ponderosa and lodgepole pine, Douglas-fir, and western larch. Most foraging occurs on large standing snags and dying trees. A habitat relationship model developed for the three-toed woodpecker in Oregon indicates that the presence of recently dead trees killed by mountain pine beetle was the best predictor of presence of the woodpecker (Chapman 2011).

According to the Sunrise project insect and disease reports, mountain pine beetles are present in remnant lodgepole pines. Older pine beetle killed trees are on the ground. This appears to be limited in extent and within mixed species stands. The main concerns in the overall area appear to be balsam wooly adelgid in the subalpine fir, and Armillaria root rot.

While various forest habitats are used for foraging, nesting appears to be consistently tied to the presence of lodgepole pine. Nesting primarily takes place in unsalvaged, recent, post fire habitat (Mellen-McLean 2012b), and in northeast Oregon they were found nesting in beetle-killed lodgepole pine (Bull 1980).
The Columbia Complex fire of 2006 was immediately adjacent to the Sunrise project area. After the fire, there was an increase in mountain pine beetle and Douglas-fir beetle activity both within and adjacent to the fire perimeter. Post-fire salvage projects Teal and Spruce were completed in 2007 and 2011 respectively. There were approximately 250 acres of salvage within the Sunrise project area, in stands of mixed subalpine fir, spruce and lodgepole pine. This reduced the amount of post fire nesting habitat for three-toed woodpecker habitat in the project area. Three-toed woodpeckers were observed in or very close to the project area in 1998, 2005 and 2006.

Current habitat for three-toed woodpeckers in the Sunrise project area was identified by querying the vegetation database for dense, moist mixed conifer, spruce, subalpine fir, and lodgepole pine. Query results indicate that there are about 4,670 acres of potential foraging habitat for three-toed woodpeckers in the project area. Approximately 620 acres of this habitat are of the lodgepole pine cover type, present in 3 distinct areas of the upper elevations of the project area. There is a slight possibility that nesting could occur.

Current estimates indicate there are 170,000 acres of three-toed woodpecker habitat on the forest (Wales, pers. commun). The Sunrise project area contributes about three percent to the forest-wide habitat for three-toed woodpeckers.

**Birds of Conservation Concern**

The appropriate state Bird Conservation Plan and USFWS Birds of Conservation Concern species list (USFWS 2008) for the project area were reviewed. Those species and habitats that may occur in the Sunrise project area and may be affected by proposed actions are listed (Table 3-29)

**Table 3-29. USFWS Birds of Conservation Concern for Bird Conservation Region 10 that may be present and potentially affected by the Sunrise project.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Preferred Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammulated owl</td>
<td>Montane forest, prefers mature ponderosa pine and Douglas-fir with open canopy, most often found on ridges and upper slopes.</td>
</tr>
<tr>
<td>White-headed woodpecker</td>
<td>Mixed conifer forests (&lt; 40 % canopy cover) dominated by old growth Ponderosa pine and open habitats with standing snags and scattered tall trees.</td>
</tr>
<tr>
<td>Lewis’ woodpecker</td>
<td>Often used burned pine forest; open canopy, shrubby understory, dead and down material, available perches and abundant insects.</td>
</tr>
<tr>
<td>Williamson’s sapsucker</td>
<td>Montane and subalpine coniferous forest, mixed deciduous-coniferous forest, nests usually in dead or decaying pine, fir, larch, or aspen. Snags are a critical component.</td>
</tr>
<tr>
<td>Olive-sided flycatcher</td>
<td>Open conifer forests (&lt; 40 % canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance.</td>
</tr>
<tr>
<td>Calliope hummingbird</td>
<td>Montane forest, mountain meadows, second-growth, and willow and alder thickets. Nests are in trees (frequently conifers) at meadow edges or in canyons or thickets along streams.</td>
</tr>
<tr>
<td>Cassin’s finch</td>
<td>Open, mature coniferous forests of lodgepole and ponderosa pine, aspen, alpine fir, grand fir and juniper steppe woodlands.</td>
</tr>
</tbody>
</table>

**Threatened, Endangered, and Sensitive Wildlife and Invertebrate Species**

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 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.

A species list was requested from the US Fish and Wildlife Service on May 18, 2017 for the Sunrise project (USFWS 2017) in order to identify which endangered, threatened, de-listed, candidate, and proposed species, if any, may be present in the project area. This species list indicated that there is a potential for the Canada lynx and yellow-billed cuckoo within Asotin and Garfield Counties, however neither of these species are expected to occur in the Sunrise project area.

Threatened, Endangered and Sensitive Species addressed on the Umatilla National Forest include those that have been documented from a valid, recorded observation, or suspected as likely to occur based on available habitat to support breeding pairs/groups. Whether these species may occur in the project analysis area is determined by observation records, vegetative and wildlife species inventory and monitoring, published literature on the distribution and habitat utilization of wildlife species, information provided by the U.S. Fish and Wildlife Service, and the experience and professional judgment of wildlife biologists on the Umatilla National Forest. These tables are based on the 2015 Regional Forester’s sensitive species list.

Table 3-30. Threatened, endangered and sensitive wildlife species for the Umatilla National Forest, Washington.

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Umatilla Forest</th>
<th>Sunrise project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada lynx</td>
<td>Lynx canadensis</td>
<td>Threatened</td>
<td>Documented</td>
<td>Not expected</td>
</tr>
<tr>
<td>Yellow-billed cuckoo</td>
<td>Coccyzus americanus</td>
<td>Threatened</td>
<td>Not expected</td>
<td>Not expected</td>
</tr>
<tr>
<td>North American wolverine</td>
<td>Gulo gulo</td>
<td>Proposed</td>
<td>Suspected</td>
<td>Possible</td>
</tr>
<tr>
<td>Gray wolf</td>
<td>Canis lupus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Preble’s shrew</td>
<td>Sorex preblei</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Rocky Mountain bighorn sheep</td>
<td>Ovis canadensis</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Mountain goat</td>
<td>Oreamnos americanus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Not expected</td>
</tr>
<tr>
<td>Townsend’s big-eared bat</td>
<td>Cynornithus townsendii</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Not expected</td>
</tr>
<tr>
<td>Little brown myotis</td>
<td>Myotis lucifugus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bald eagle</td>
<td>Haliaeetus leucocephalus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>Falco peregrinus</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Not expected</td>
</tr>
<tr>
<td>Great gray owl</td>
<td>Strix nebulosa</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Northern goshawk</td>
<td>Accipiter gentilis</td>
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<td>Documented</td>
<td>Documented</td>
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<tr>
<td>White-headed woodpecker</td>
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<td>Documented</td>
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<tr>
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<td>Melanerpes lewis</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
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<td>Green-tailed towhee</td>
<td>Pipilo chlorurus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Mountain quail</td>
<td>Oreortyx pictus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
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<tr>
<td><strong>Amphibians</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rocky Mountain tailed frog</td>
<td>Ascaphus montanus</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
</tbody>
</table>
The following species are not expected to occur in the project area and will not be discussed further:

- Canada lynx – Umatilla forest is considered unoccupied (USFS 2006). There have been no verified records since one was trapped near Mt. Misery in 1931. The U.S. Fish and Wildlife Service concluded that lynx may occur on the forest as dispersers that have never maintained resident populations. This is based on the lack of reproduction records, limited verified records of lynx, low frequency of occurrences, and correlations with cyclic highs with populations in Canada (USFWS 2003).

- Yellow-billed cuckoo – breeding populations are considered extirpated in the state of Washington (USFWS 2014, USFWS 2014b).

- Townsend’s big-eared bat is strongly associated with spacious cavern-like structures for roosting during all stages of its life cycle (Gruver and Keinath 2006). Individuals or small groups may day roost in hollow and creviced trees and snags near water for a limited time, but tend to stay within a few miles of colonial roosts (Perkins and Schommer 1992). The nearest colonial roost is about 20 miles away near the town of Asotin and there are no records of Townsend’s big-eared bats on the district.

- Mountain goat – the existing goat population in the Wenaha-Tucannon Wilderness was introduced on the Oregon side and is not contiguous with the Cascade or Rocky Mountain populations. Mountain goats are not known to inhabit the project area.

- Peregrine falcon – There are no suitable cliff nesting areas and no record of presence. There are no known nest sites on the Umatilla National Forest.

Wolverine

The northern Rocky Mountains, including the Blue Mountains, are considered the southern portion of the species range. Wolverines here require high elevation alpine forest with deep persistent snow (Copeland et al. 2010). Most year-round habitat is found near the tree line in conifer forests, and in cirque basins and avalanche chutes that have food sources such as marmots, voles, and carrion (Inman et al. 2011).

While there have been many reports of wolverines on the forest, none have been verifiable. The nearest known area of confirmed wolverine activity is in the Wallowa Mountain Range. Extensive track and camera surveys and resulted in the detection of four different individual wolverines in the Eagle Cap Wilderness in the years 2010-2012 (Magoun et al. 2013). The Wallowa Range appears to have enough snow cover to support wolverine, but at this time it does not appear that a breeding population exists (Magoun et al. 2013).

Various winter track surveys have been conducted intermittently on the forest, and no tracks have been detected. There are also ongoing efforts to detect American marten and wolverine on the forest with cameras, but not on the scale that is necessary to complete a systematic survey.

The Umatilla forest contains very little alpine or high elevation tree line habitat and provides relatively small areas with persistent snow cover in comparison to areas with known wolverine populations. However the forest may provide foraging opportunities for individuals. Wolverines are opportunistic scavengers with large mammal carrion the primary food source year-round. They depend on carnivores like wolves, cougars, and bears in part to provide scavenging opportunities (Banci 1994, Van Dijk, et al. 2008). They are known to travel 18-24 miles in a day in their daily hunt for food (Banci 1994).
The project area is not within or near any high elevation alpine forest that would support deep snow into May for wolverine reproduction. There are no cirque basins, avalanche chutes, or open boulder slopes.

**Gray wolf**

The project area is within the Northern Rocky Mountain Distinct Population Segment (DPS) of the gray wolf, which was recently removed from the federal Endangered Species List (USFWS 2011, USFWS 2009). Wolves remain listed on the state of Washington’s Endangered Species List (WDFW et al. 2017).

A wolf pack known as the Tucannon pack utilizes areas in and around the Sunrise project area. Wolves in Washington are managed according to a state wolf conservation and management plan (Wiles et al. 2011).

Wolves can occupy a variety of habitat types provided adequate prey exists (Keith 1983, Fuller 1989, Haight et al. 1998) and human activity is minimal (Oakleaf et al. 2006, Belongie 2008). The primary prey species of gray wolves are large native ungulates (Haight et al. 1998, Fuller et al. 2003). Gray wolves are typically sensitive to human disturbance near den and rendezvous sites. The entire Forest is considered suitable habitat for gray wolves.

The primary prey species in this area are elk and deer, both of which have healthy populations. There are no known wolf dens or rendezvous sites within the project area. Repeated conflicts with livestock have not been reported for the Tucannon wolf pack.

**Preble’s shrew**

Preble’s shrew are an uncommonly noted species that has been primarily found in high desert riparian areas. Only a few records have been noted in coniferous forest. According to Armstrong (1957), nine specimens of Preble’s shrew were captured in pit traps on the western edge of the project planning area near Clearwater lookout. These are the only records of Preble’s shrew in the state of Washington. The Pomeroy sites were described in very general terms as lodgepole pine with small poles and fir forest (Armstrong 1957). Unfortunately there is not enough information to revisit the precise locations they were found. They were not far from major roads, which may have been the only roads at the time. Clearcut harvesting occurred in the general area in the past, as well as salvage harvest in recent years (see map in project file).

**Rocky Mountain bighorn sheep**

Bighorn sheep are native to the area but were gone from the region by 1945 due to over-hunting, competition for forage with domestic livestock, and introduced diseases (Coggins and Mathews 1996). Restoration of bighorn sheep to Hells Canyon and adjacent habitat has been an ongoing effort with measured success, however populations continue to be primarily threatened by disease transmission from domestic sheep.

Bighorn sheep typically use rugged, open to semi-open grassland that allows high visibility. They may be seen on both steep and gentle slopes, broken cliffs, rock outcrops, and canyons and their adjacent river benches and mesa tops (Beecham et al. 2007). Expanses of rim rock, broken cliffs, and rock outcrops are especially important for lambing and escape from predators. Grasses are the staple forage species, complemented seasonally with forbs and shrubs.

The Sunrise project planning area is utilized by the Asotin bighorn sheep herd, which is part of the Hells Canyon bighorn sheep meta-population. They use North Fork Asotin Creek drainage
and in particular, the Asotin Creek Roadless Area. The population is about 70 sheep (Fortin and Cassirer 2015).

**Little brown myotis**

Little brown myotis is considered ‘apparently secure’ in the state of Washington (S4), but globally vulnerable (G3) (Natureserve 2017). There has been a rapid decline in numbers in eastern North America due to white-nose syndrome, an introduced fungal disease. White-nose syndrome was recently detected in northwestern Washington, and one of the cases was a little brown myotis (WDFW 2016). Mortality from wind turbines is also a factor in little brown myotis declines.

The presence of this bat was documented in a 2007 survey on state land along the Tucannon River, outside of the project area. Since no other surveys have been done, these are the only documented locations on or near the Pomeroy Ranger District.

Little brown myotis use a wide range of habitats and often use human-made structures for resting and maternity sites. Foraging habitat requirements are generalized; foraging occurs over water, along the margins of lakes and streams, or in woodlands near water. Winter hibernation sites (caves, tunnels, abandoned mines, and similar sites) generally have a relatively stable temperature of about 2-12 °C. Maternity colonies commonly are in warm sites in buildings (e.g., attics) and other structures; also infrequently in hollow trees. Microclimate conditions suitable for raising young are relatively narrow, and availability of suitable maternity sites may limit the species' abundance and distribution (NatureServe 2017).

There are mixed conclusions regarding forest management effects to bats (Thomas 1988, Humes et al. 1999, Grindal and Brigham 1999). Bat survey methods have site biases and capture data cannot provide unequivocal information on the distribution of bats among various sites or habitats (Thomas and West 1991). In general, removal of large old trees and snags is a concern (Christy and West 1993) because it reduces roosting opportunities. Structural characteristics of large old trees and snags such as cracks and crevices in thick bark, bark pulling away from the trunk thus forming crevices, and holes in the bole where limbs have been shed, hollow interiors offer many potential roosting sites. These large live and dead trees are primarily associated with older stands, but may also be present in younger stands.

**Bald eagle**

Bald eagles occasionally travel through the project area. They have been seen in Asotin Creek and Lick Creek, but no roost or nest sites are known in the project area. There are bald eagle nests on the Tucannon River to the west and on the Snake River to the east, both more than 10 miles from the Sunrise project area.

**Great gray owl**

Great gray owls use a variety of habitats, primarily mature forests interspersed with open areas suitable for foraging (Duncan and Hayward 1994). Older and mature forests with high canopy closure, adjacent to open areas suitable for foraging, are preferred for nesting, although second-growth forests are sometimes used (Bryan and Forsman 1987; Bull and Henjum 1990). Its preferred foraging habitat includes montane meadows and open forests and prey species include voles, gophers and other rodents. Bogs, clearcuts, and early successional forests are also used for foraging (Bryan and Forsman 1987).
There are no reports of great gray owl in the project planning area. Nesting has not been documented on the forest to date. Grassy areas next to mature forest are common in the Sunrise project area, so it is possible that nesting could occur. They typically use large diameter broken off snags or abandoned nests of other raptors.

**Northern goshawk**

The northern goshawk is considered a habitat generalist at large spatial scales, however it typically nests in a narrow range of structural conditions (Squires and Kennedy 2006). Goshawks prefer mature forest with large trees, and relatively closed canopy with an open understory for nesting. Nests are frequently found near the lower portion of moderate slopes and near water.

A study in the Blue Mountains found that structural stage, tree basal area, and low topographic position reliably discriminated between nests and random sites. Positive correlations were found between fledging rate and tree basal area within 1 ha of the nest (McGrath, et al. 2003). Most nests in the Blue Mountains have been found in stands with ponderosa pine, but survey effort has been lacking in other cover types. Therefore non-pine cover types are not ruled out as potential goshawk habitat.

No goshawk nests are currently documented in the planning area. A query of vegetation data for areas with at least 50 percent tree cover and the presence of large diameter trees resulted in approximately 9,500 acres of potential goshawk nesting habitat. These stands are well distributed throughout most of the planning area. Not all of these areas would actually be suitable for nesting; quality nesting habitat would typically be within ¼ mile of water, in the lower portion of the slope, and often on the north facing slope.

Important habitat attributes of goshawk prey species include snags, downed logs, woody debris, large trees, openings, herbaceous and shrubby understories and an intermixture of various forest structural stages (Wisdom et al. 2000).

Goshawk surveys will be conducted in areas of high potential that may be affected by project activities. The Eastside Screens (USFS 1995) provide for specific protections for goshawk nesting territories. If active nests are found at any time, they would be protected as specified in the project design criteria (see Chapter 2).

**Lewis’s woodpecker and White-headed woodpecker**

Both Lewis’ and white-headed woodpeckers are associated with open ponderosa pine forest. Although habitat is currently limited, both species have been observed in the project area.

Lewis woodpeckers tend to use open ponderosa pine forest, open riparian woodland dominated by cottonwood, and burned pine forest (Tobalske 1997). Perhaps due to their lack of excavation abilities typical of other woodpeckers, they nest primarily in snags or soft-wooded trees in areas that provide an abundance of aerial insects. Lewis’s woodpeckers rarely, if ever, probe for wood-boring insects but instead employ the technique of fly catching (Abele et al. 2004).

White-headed woodpecker habitat is typically open ponderosa pine with large trees and snags. This species relies almost exclusively upon the seeds from large ponderosa pine cones for its foraging needs. They will also utilize insects that are gleaned off ponderosa pine trees. Large ponderosa pine snags are utilized for nesting.

The loss of breeding and wintering habitats in the form of open park-like ponderosa pine forests, burned pine forests and riparian cottonwood stands is thought to be the primary threat to the
long-term persistence of Lewis’s woodpecker populations (Abele et al. 2004). Maintenance of open forest stands through natural fires, prescribed burns, selective timber harvest, and restoration of cottonwood would serve to conserve Lewis’ woodpecker.

The Sunrise project area has about 1,000 acres of ponderosa pine cover type with open pine. Much of it is not technically classified as old forest, single-stratum ponderosa pine (OFSS), but potentially does have stand characteristics that these species would use. Cottonwood groves and burned pine forest are not found in the area.

**Green-tailed towhee**

Green-tailed towhees breed mainly at higher elevations (5,000-10,000 feet) throughout much of the Rocky Mountains, Great Basin, and Sierra Nevada of the western United States (Dobbs 2006). In Washington, they don’t appear to breed any further north than the Blue Mountains.

Green-tailed towhee have been documented just over the ridge from the Sunrise project on a shrubby south-facing slope. The species is primarily associated with heterogeneous shrub habitat. In forested areas, they commonly use dry shrubby hillsides and post-disturbance, shrubby second growth conifer forest (Dobbs et al. 1998). They also are known to occur in shrubland-woodland savannah’ or very open ponderosa pine with sagebrush, juniper and other shrubs dominating (Dobbs 2006).

**Mountain quail**

In the drier eastern portions of its range, mountain quail are found in mountain and riparian shrub communities on steeper slopes, and in early successional-stage shrub vegetation following fire, logging, and other disturbances (USFWS 2003b).

Mountain quail occurred historically in the Blue Mountains in southeastern Washington (Crawford 2000), but this was likely due to translocations in the late 19th century. Little evidence suggests that they were native to Washington (Vogel and Reese 1995). Birds from multiple sources were brought into Washington, resulting in mixing of various subspecies. Populations in eastern Washington have been in a severe decline, as reported by Vogel and Reese (2002).

The nearby Chief Joseph Wildlife Area contains a remnant population of mountain quail (WDFW 2006). Washington Department of Fish and Wildlife has attempted introductions in the North and South Forks of Asotin Creek in recent years with little success (Vekasy and Wik 2015), but it is possible a few may occur in the project planning area.

**Rocky Mountain tailed frog**

Tailed frogs are associated with cold, high gradient, boulder and cobble dominated streams. Tadpoles have long larval periods and require permanent, rocky streams that are cool and well oxygenated all year (Bury and Adams 1999). Froglets and adults often hide in gravel and cobble substrates, and tadpoles cling to boulders and cobbles.

Tailed frogs have documented in many areas of the Umatilla forest and are present in and adjacent to the project planning area. They were observed in Charley Creek in 2004 and North Fork Asotin Creek in 2005.

**Invertebrate species**

The distribution and habitat requirements of the sensitive invertebrates listed for the Umatilla forest are poorly understood. Sometimes an invertebrate species is found to be more common
than originally thought, once specific surveys are conducted. Several surveys have been conducted on the Umatilla NF in recent years, but none were within the project area for these specific species. Only the Great Basin fritillary has been documented in the project area and it is found in numerous places on the forest. No other sensitive invertebrate species potentially occurring on the Umatilla National Forest have been documented within the Sunrise project area.

Most of the snail species are found where moist microsites are created by key habitat components such as talus rock, down logs, moist ravines, nearby water features. All of the sensitive insects are reliant upon flower nectar. Key habitat components for the butterflies and bumble bee are meadows and other forest openings, open hillsides, ridges and talus. Johnson’s hairstreak is unique in that its larval state is associated with mistletoe in the trees and adults are often in the forest canopy.

Historic records of meadow fritillary place it on the Umatilla NF, but it is now believed to be absent from Oregon and Washington (Fleckenstein and Huff 2007a). Barry's hairstreak caterpillars feed on juniper and this habitat is not present in the project area (Fleckenstein and Huff 2007b). Columbia clubtail have not been found on the forest. The nearest known location to the Sunrise project is the Yakima River. They have a very restricted range that seems to be associated with slow moving rivers (Scheuering 2006). It is unlikely that this species occurs in the project area.

### Table 3-31. Sensitive invertebrate species for the Umatilla National Forest, Washington.

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Umatilla Forest</th>
<th>Sunrise project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Molluscs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fir pinwheel</td>
<td>Radiodiscus abietum</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Columbia Gorge oregonian</td>
<td>Cryptomastix hendersoni</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Pristine springsnail</td>
<td>Pristinocola hemphilli</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Thinlip tightcoil</td>
<td>Pristiloma idahoense</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Humped coin</td>
<td>Polygyrella polygyrella</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
<tr>
<td>Shiny tightcoil</td>
<td>Pristiloma wascoense</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Possible</td>
</tr>
<tr>
<td>Salmon coil</td>
<td>Helicodiscus salmonaceus</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Butterflies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Basin fritillary</td>
<td>Speyeria egleis</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Documented</td>
</tr>
<tr>
<td>Meadow fritillary</td>
<td>Boloria bellona</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Not expected</td>
</tr>
<tr>
<td>Johnson’s hairstreak</td>
<td>Callophys johsoni</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Possible</td>
</tr>
<tr>
<td>Barry’s hairstreak</td>
<td>Callophys gryneus barryi</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Not expected</td>
</tr>
<tr>
<td>Lustrous copper</td>
<td>Lycaena cupreus</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Other Insects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia clubtail</td>
<td>Gomphus lynnae</td>
<td>Sensitive</td>
<td>Suspected</td>
<td>Not expected</td>
</tr>
<tr>
<td>Western bumble bee</td>
<td>Bombus occidentalis</td>
<td>Sensitive</td>
<td>Documented</td>
<td>Possible</td>
</tr>
</tbody>
</table>

### Table 3-32. Sunrise project potential sensitive invertebrates and their habitats.

<table>
<thead>
<tr>
<th>Species</th>
<th>Documented on UNF</th>
<th>Habitat, surveys, and known locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fir pinwheel</td>
<td>Yes</td>
<td>Recently documented in the Touchet River drainage on the Umatilla NF, 20 air miles southwest of Sunrise project. Inhabits moist and rocky Douglas-fir forest at mid-elevations in valleys and ravines (Duncan and Huff 2009). It is known to live in or near talus of a variety of rock types or under fallen logs (Frest and Johannes 1995).</td>
</tr>
</tbody>
</table>
Columbia Oregonian

Yes

Surveys in 2010 and 2012 found this snail at four sites in the Touchet River drainage, as well as in the South Fork Umatilla River on the Umatilla NF (Jepsen and Jordan 2011). Little is known about the ecology of this species, but these sites were rocky and generally moist areas on hillsides just above the rivers.

Pristine pryg (springsnail)

Yes

The only completely aquatic snail on our sensitive list. Found at many locations on the Oregon side of the Umatilla forest, but only one record known from a state inholding on the Washington side. Associated with springs and seeps in ‘pristine’ condition and associated small streams with coarse gravel or cobbles. See Andrews and Huff 2010

Thinline tight coil

Yes

Low elevation ponderosa pine and Douglas-fir forests. Moist valley, ravine, gorge or talus. This species was found in the South Fork Umatilla River area in 2012 (Jepsen et al 2012).

Shiny tight coil

No

Ponderosa pine and Douglas-fir forests at moderate to high elevations (Frest and Johannes 1995). The nearest record is near Wallowa Lake in Oregon.

Salmon coil

No

Dry rocky habitats, often intermixed with sagebrush and grasses. Found in 2012 on BLM lands in Asotin County, east of the project planning area near the Idaho border (Jepsen and Jordan 2011).

Humped coin

Yes

Recently documented in the Touchet River drainage (Jepsen and Jordan 2011), this species is associated with moist Douglas-fir and spruce forest, often in association with outcrops and talus of various rock types (Frest and Johannes 1995). It inhabits moss and decaying wood in dampest areas of forest cover; moist valley, ravine, and talus sites are preferred, apparently near water (Frest and Johannes 1995).

Johnson’s hairstreak

No

An old growth obligate, caterpillars of this butterfly feed exclusively on aerial shoots of dwarf mistletoe plants (Andrews and Huff 2011). Johnson’s hairstreak in northeastern Oregon were found feeding on western dwarf mistletoe on ponderosa pine (Spiegel 2014). The nearest known location is on the Wallowa Whitman National Forest, east of North Powder, Oregon. Recent surveys on the Heppner Ranger District failed to locate any Johnson’s hairstreak.

Great Basin fritillary

Yes

Great Basin fritillary have been found in numerous places on the Pomeroy Ranger District. One record of this butterfly is within the project area, near Sunset point. Many records are outside the planning area, but close by. This butterfly inhabits openings and edges in forest habitats including montane meadows, forest clearings, exposed rocky ridges, and stream banks (Fleckenstein and Huff 2007c).

Lustrous copper

No

There are no records of lustrous copper on the Umatilla NF; the nearest known location is in northern Idaho, but it is also found in Oregon, so there is a possibility it would be in between. Habitat is mountain ridges and slopes, meadows, talus fields, and sometimes along streams (Fleckenstein and Huff 2007d).

Western bumble bee

Yes

The nearest known location of Western bumble bee is from 1922 near Field Peak, about 10 miles west of the project area. These bees have been observed taking nectar from a variety of flowering plants (Evans et al 2008). Meadows and other openings often provide flowers for food, and abandoned rodent burrows provide nest and hibernation sites.

Environmental Consequences

Alternative A (No Action)

**Elk**

**Tree Cover**

The amount and distribution of elk cover would not likely change in the short-term. Over the mid and long-term (beyond 10 years), some stands could grow into thicker hiding cover while others may deteriorate. Increased susceptibility to insect, dwarf mistletoe, and disease disturbances (see Silviculture Report) would potentially cause some trees to die and fall, which
would allow pockets of foraging areas to develop. If wildfire occurred in the future, the combination of high tree densities, increasing fuel loads, and the presence of fire-intolerant tree species could result in uncharacteristic crown fires (Fuels Report) and potentially large scale but short term loss of elk cover.

Roads

No changes in road densities are anticipated. The 4000-360 road would continue to close in October. Elk would continue to be disturbed by vehicle traffic from August to October, an important time for calf growth and putting on weight to last through the winter.

HEI

There would be no change to the HEI value. The area would likely remain within forest plan standards.

Forage

Without proposed controlled burns important elk forage species may become more decadent and less nutritious or palatable to ungulates. Previously planned burning (Asotin Burn) in the northeast portion of the planning area would move forward.

Late and Old Forest

Taking no action contributes toward meeting Forest Plan direction over the short-term by maintaining existing habitat for late and old structure dependent species such as pileated woodpecker, American marten and northern three-toed woodpecker. Ongoing disturbance and succession processes influencing vegetation conditions would continue as they have in recent years. Forest density would increase and multi-strata old forest would continue to occupy a large percentage of the forest landscape (>50%).

Over the mid and long term, there would be increasing amounts of multi-strata old forest, higher tree densities and susceptibility to natural disturbances (Silviculture Report). Thirty-two percent of moist and dry forest would continue to be at risk of uncharacteristic crown fire (Fuels Report). Over the long-term, by increasing the risk of insect infestations, disease, and uncharacteristic wildfire, the No Action alternative does not contribute toward development or maintenance of healthy diverse forest conditions that would move forests toward desired conditions for the Blue Mountains.

American Marten

Existing marten habitat would remain in its current state in the short term. Multi-strata, moist and cold old forest would continue to occupy a large percentage of the forest landscape (5,500 acres), which is currently providing the majority of marten habitat (6,225 acres). Over the mid and long term, there would be increasing amounts of old forest, stands with higher tree densities, mid and late seral species, and susceptibility to natural disturbances (Silviculture Report). Because marten utilize areas of high down wood densities, they would benefit from an increase in snags and down wood as stands mature. The longevity of such stands is questionable, however, due to the increased potential for widespread mortality due to natural disturbances such as insect, disease, and uncharacteristic wildfire.
Dead and Down Tree Habitat

Within the next five years, dead standing trees (snags) would continue to occupy the project area at current densities and size classes, barring disturbance such as a large scale, high severity wildfire. Although snags would continue to be lost and created on the landscape in the short term, the existing snag density distribution would not be expected to change in this short timeframe.

In the mid and long term, snag densities have the potential to increase in the analysis area through naturally occurring mortality caused by insect and disease, or due to wind and wildfire. Some existing snags would fall to the ground, increasing down wood in the analysis area.

Mortality caused by insects and disease would be patchy, creating small to moderately sized “islands” with high densities of snags in the early stages of decay. These islands would provide habitat for primary cavity excavators (e.g., black-backed, three-toed, and Lewis’ woodpeckers) and other wildlife that require pulses of high-density snags.

The risk of high-severity wildfire would also increase over time. If fires occurred, snag densities would initially increase due to immediate and delayed fire mortality. Species that show an affinity for post-fire conditions (e.g., black-backed, three-toed, and hairy woodpeckers) would benefit in the short term following this type of event. Ultimately, snags resulting from this event would fall and snags would be relatively scarce until regenerating stands become old enough to produce large trees, a time period ranging from 80 to 100 years.

Pileated Woodpecker

Existing pileated woodpecker habitat would remain in its current state in the short term. In the mid and long term, more snags would be created as trees die. Over the mid and long term, there would be increasing amounts of old forest, stands with higher tree densities, mid and late seral species, and susceptibility to natural disturbances (Silviculture Report). Because woodpeckers utilize areas of high snag and down wood densities, they would benefit from an increase in snags and down wood as stands mature. The longevity of such stands is questionable, however, due to the increased potential for widespread mortality due to natural disturbances such as insect, disease, and uncharacteristic wildfire.

Three-toed Woodpecker

Existing three-toed woodpecker habitat would remain in its current state in the short term, with habitat enhanced by limited amounts of additional mortality from mountain pine beetle activity.

Over the mid and long term, there would be increasing amounts of old forest, stands with higher tree densities, mid and late seral species, and susceptibility to natural disturbances (Silviculture Report). Any future fire and/or beetle mortality in trees would benefit three-toed woodpeckers.

Threatened, Endangered, and Sensitive Wildlife and Invertebrate Species

Wolverine

Existing habitat conditions would continue to provide foraging habitat for wolverine. No decline in prey species would be expected in the short term, and there would be no change in open road densities. In the event of a large wildfire, forest cover could be removed over large areas, but eventually shrubs would respond positively and wolverine prey species would still be present.
Gray wolf
No decline in prey species would be expected in the short term, and there would be no change in open road densities. There may be increased risk of uncharacteristic wildlife if fuels are not reduced. If fire reduces forest cover over a large area, wolves may be less likely to use the area for a few years, but then resume activity in relation to ungulate availability as shrubs and grasses sprout up (Ballard et al. 2000).

Preble’s shrew
With continued fire suppression, tree densities would increase and surface fuels and fuel ladders would continue to accumulate in the area, leading to a corresponding increase in the potential for high-intensity crown fires. Such events could remove entire forest stands across extensive areas in both upland and riparian habitats. In burned areas, leaf litter and low concealing cover would be removed or adversely modified over the short-term. This could negatively impact prey species and potentially make shrews more susceptible to predation.

Rocky Mountain bighorn sheep
There would be no effects to bighorn sheep if the proposed actions are not implemented. Bighorn habitat is unaffected by changes or lack of changes to forested area. If the prescribed burning were not implemented, that would be a lost opportunity to enhance forage in the grassy areas, but other burning in the Asotin bighorn sheep area has already been planned and would be implemented over the next few years.

Little brown myotis
Alternative A would maintain potential habitats for little brown myotis in the short-term, but this alternative would not address the increasing risk of a high intensity fire which could remove potential roosting structures. In the absence of wildfire, increasing densities of large decaying and dead trees would provide more roosting habitat for bats.

Bald eagle
There would be no effects to bald eagles if the proposed actions are not implemented. There are no nest sites or roost sites, and presence is very infrequent.

Great Gray Owl
Alternative A would maintain potential habitats for great gray owls in the short-term, but this alternative would not address the increasing risk of a high intensity fire which could remove potential nesting structures and entire nest stands in the area.

Northern goshawk
Alternative A would maintain all of the potential habitat for goshawk in the short-term, but this alternative would not address the increasing risk of a high intensity fire which could remove entire stands.

Lewis’s woodpecker and White-headed woodpecker
Alternative A would maintain all of the potential habitat for these species in the short-term, but this alternative would not address the increasing risk of a high intensity fire which could remove entire stands. If lower intensity fires occur in ponderosa pine forest, which happens at times, that would be beneficial to Lewis’ woodpecker.
Green-tailed towhee

Alternative A would maintain all of the potential habitat for green-tailed towhee in the short-term. Wildfire could potentially reduce habitat, but this species is associated with shrubby areas and second growth forest, so effects would be short-lived.

Mountain quail

There would be no impacts to mountain quail since new forest management activities would not be initiated in the project area. Even in the event of wildfire, mountain quail are known to return to burned areas where there is cover remaining or sprouting.

Rocky Mountain tailed frog

There would be no impacts to tailed frogs since new forest management activities would not be initiated in the project area. Generally the only indirect effect might be a high intensity wildfire caused by fuels build up that could burn riparian areas, affecting water quality and streamside shade.

Invertebrate species

There would be no immediate impacts to sensitive invertebrates since new forest management activities would not be initiated in the project area. Generally the only indirect effect might be a future high intensity wildfire caused by fuels build up.

Alternatives B and C

Elk

Tree Cover

- Cover for elk would meet forest plan standards in both action alternatives (Table 3-25).
- Landscape burning would be designed to maintain adequate amounts of elk cover

MA-C3: The amount of total cover would not change in MA-C3, but some satisfactory cover would be converted to marginal cover. (Table 3-33).

MA-C4: Harvest and fuels treatments proposed in MA-C4 would substantially reduce the amount of satisfactory and total cover (2,630 acres). Alternative C would maintain 1,800 acres more elk cover than Alternative B on the landscape in a better distribution pattern for elk and other wildlife (Table 3-34.) More elk cover would be maintained in these areas (1,800 acres) until the surrounding openings created develop into cover.

<table>
<thead>
<tr>
<th>Management Area C3 (7,100 acres)</th>
<th>Current Elk Cover</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory Cover</td>
<td>1140</td>
<td>- 375</td>
<td>- 375</td>
</tr>
<tr>
<td>Marginal Cover</td>
<td>995</td>
<td>+ 375</td>
<td>+ 375</td>
</tr>
<tr>
<td>Total</td>
<td>2135</td>
<td>+/- 0</td>
<td>+/- 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management Area C4 (13,425 acres)</th>
<th>Current Elk Cover</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory Cover</td>
<td>4770</td>
<td>-1870</td>
<td>-730</td>
</tr>
<tr>
<td>Marginal Cover</td>
<td>2300</td>
<td>-760</td>
<td>-60</td>
</tr>
<tr>
<td>Total</td>
<td>7070</td>
<td>-2630</td>
<td>-790</td>
</tr>
</tbody>
</table>
Elk cover in Management Area C4, outside of roadless area

Figure 3-6. Elk cover in MA-C4 after implementing Alternative B.
MA-C8: Landscape burning is the only activity proposed in MA C8 because it is a roadless area. Although we would not anticipate a loss of cover due to landscape burning, we identified some likely areas where that could happen in the roadless area (Table 3-35).

### Table 3-35. Cover reduction by alternative in MA-C8 (acres).

<table>
<thead>
<tr>
<th>Management Area C8 (9,665 acres)</th>
<th>Current Elk Cover</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory Cover</td>
<td>1745</td>
<td>-415</td>
<td>-415</td>
</tr>
<tr>
<td>Marginal Cover</td>
<td>1430</td>
<td>+150</td>
<td>+150</td>
</tr>
<tr>
<td>Total</td>
<td>3175</td>
<td>-265</td>
<td>-265</td>
</tr>
</tbody>
</table>

HEI and Roads

- HEI values would remain within forest plan minimum standards in both Alternatives and all three management areas (Table 3-36).
- For both action alternatives, there would be no change in the open road densities.
Table 3-36. Comparison of effects to elk habitat by alternative.

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management Area C3/C3A (7,070 acres)</td>
<td>[Table Data]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory Cover</td>
<td>10 %</td>
<td>16 %</td>
<td>11 %</td>
<td>11 %</td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>30 %</td>
<td>30 %</td>
<td>30 %</td>
<td>30 %</td>
<td></td>
</tr>
<tr>
<td>HEI</td>
<td>70</td>
<td>78</td>
<td>75</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management Area C4 (13,425 acres)</td>
<td>[Table Data]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory Cover</td>
<td>15 %</td>
<td>36 %</td>
<td>21 %</td>
<td>30 %</td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>30 %</td>
<td>53 %</td>
<td>33 %</td>
<td>47 %</td>
<td></td>
</tr>
<tr>
<td>HEI</td>
<td>60</td>
<td>70</td>
<td>68</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management Area C8 (9,670 acres)</td>
<td>[Table Data]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory Cover</td>
<td>10 %</td>
<td>18 %</td>
<td>13 %</td>
<td>13 %</td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td>30 %</td>
<td>33 %</td>
<td>30 %</td>
<td>30 %</td>
<td></td>
</tr>
<tr>
<td>HEI</td>
<td>70</td>
<td>82</td>
<td>80</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Open Road Density</td>
<td>&lt; 2.0</td>
<td>.05</td>
<td>.05</td>
<td>.05</td>
<td></td>
</tr>
</tbody>
</table>

Some closed roads would be opened temporarily for harvest and fuels activities; however they would remain closed to the public. Temporary roads would be established, but decommissioned once the project is completed. These areas would be seeded and would likely have established vegetation within a year. Alternative B would require using 39 miles of existing closed roads and 14 miles of temporary road. Alternative C would require using 34 miles of existing closed roads, and 8 miles of temporary road.

Because Alternative C would have fewer miles of road being used and fewer miles of vegetation disturbed for temporary access, there would be less effect to elk during project activities. Motorized vehicles using temporary roads and existing roads that have been closed for many years would likely cause elk to avoid these areas when activity is occurring. Since proposed activities would take place gradually over several years, activities would be spread out in space and time, the road use would not cause elk to move out of the area permanently. Elk may even return to the areas at night when operations shut down. All activities in the winter range would be restricted from December 1 through March 30. Roads closed for elk calving would not be used until after June 30.

Devil’s Tailbone Road (4000-360) currently closes October 11, opens November 5, and closes again December 1. Alternative C proposes closing the gate on Forest Road 4000-360 on August 1 to match nearby roads. Having the same closure date would reduce confusion on our travel maps, reduce administrative costs, and improve elk security. The first mile of the road would remain open year-round.

Cover is currently limited along this road, due to natural openings as well as past harvest. Alternative B proposes treatments along the entire length of this road, and much of it on both sides of the road. A substantial amount of canopy cover and hiding cover would be removed with regeneration harvest and thinning. Alternative C also maintains 200 more acres of cover along this road than Alternative B.

The earlier closure date in Alternative C would provide additional elk security during late summer and fall, a time when elk are putting on weight to last through the winter. It would also potentially reduce elk movements onto private land.
Forage
Prescribed burning would directly decrease forage for big game for a short time, but burning activities would be spread over multiple years. Upon completion of each burn area, there would be a mosaic of unburned, lightly burned, moderately burned, and intensely burned patches. As green-up occurs the following spring and summer; new grass sprouts would be highly palatable and rich in nutrients. Increased vigor and palatability of grasses lasts only a year or two, but where shrubs and understory trees are burned, the forage base would increase over the mid-term. Similarly, non-commercial thinning, commercial thinning, and regeneration harvest of trees can increase forage for elk in the mid-term (Cook 2002).

All management activities would be followed by seeding with native seed where it is needed. Aerial fertilizer may be applied to key forage areas if funding is available. Growth in the elk population would not be likely, or at least not attributable to this project, but elk may be more inclined to stay on national forest where forage is enhanced rather than move onto private lands where crop damage may occur.

Forest Plan Consistency
Alternative B could result in a slightly negative habitat trend due to the resulting poor distribution of cover in elk summer range. Alternative C would maintain a better distribution of summer range cover and the change in Forest road 4000-360 closure date would improve elk security. Alternative C would likely result in no net change in mid to long-term habitat trend. Forest plan standards for elk habitat would be met, and no changes to the elk population are expected as a result of these actions. Both Alternatives B and C are consistent with the forest plan and continued viability of Rocky Mountain elk is expected on the Umatilla National Forest.

Late and Old Forest
There are 3,030 acres of OFMS and 100 acres of OFSS affected by cutting units, totaling 3,130 acres. (Table 3-37) Alternative B includes 2,130 acres of tree cutting with removal of larger trees (up to 21 inches dbh), plus 1,000 acres of tree cutting with removal of small trees only (up to 10 inches dbh). Alternative C includes 880 acres of tree cutting with removal of larger trees and the same 1,000 acres of small diameter cutting. The effects from small diameter thinning and landscape burning are the same for both action alternatives.

<table>
<thead>
<tr>
<th>Cutting activity</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinning and regeneration harvest up to 21 inch dbh trees</td>
<td>2,130</td>
<td>880</td>
</tr>
<tr>
<td>Thinning only up to 10 inch dbh trees</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,130</td>
<td>1,880</td>
</tr>
</tbody>
</table>

No live trees ≥ 21 inches DBH would be removed except for danger trees, and no snags > 20 inches dbh would be removed except for danger trees. Large snags may not be available in all affected stands, but all units would maintain snags and down wood equal to or in excess of Forest Plan standards where they are available. The healthiest large trees and the soundest large snags would remain as the building blocks for present and future stand and wildlife habitat development.

About one third of the silvicultural activities in old forest include movement from old forest multi-strata (OFMS) to old forest single-stratum (OFSS) (Table 3-28). Cutting methods occurring in existing old forest include intermediate and regeneration harvests. Regeneration
methods would include individual-tree and group selection, shelterwood preparatory cutting, or shelterwood seed cutting. All treatments in existing old forest would retain at least 10 trees/acre ≥ 21 inches dbh.

Group selection harvests in old forest would typically create openings less than two acres in size, and the stand as a whole is still considered well-stocked and meeting minimum old forest requirements. Such openings to allow more light penetration to the ground to regenerate shade-intolerant, early seral species such as western larch and lodgepole pine.

Landscape burning outside of cutting units is predicted to potentially create 1,800 acres of OFSS in both alternatives by burning the small trees in the understory. Effects from landscape burning are also included in Table 3-38.

Note that Alternatives B and C are similar in the amount of OFMS converted to OFSS in dry forest. This is because the treatments are the same for the majority of dry forest.

There is a larger discrepancy in moist old forest between alternatives because many units retained for elk cover in Alternative C happen to be moist upland, old forest. The end result of both alternatives is a substantial change from OFMS to OFSS.

There are also some cutting units that would maintain enough understory to remain classified as OFMS (800 acres, both alternatives). Stands that are currently OFSS would only be treated with hand thinning and landscape fire such that they remain OFSS (100 acres).

<table>
<thead>
<tr>
<th>Old Forest Structure Type</th>
<th>Existing</th>
<th>Alt B Change</th>
<th>Alt C Change</th>
<th>Alt B Result</th>
<th>Alt C Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry OFSS</td>
<td>843</td>
<td>+1,891</td>
<td>+1,641</td>
<td>2,733</td>
<td>2,484</td>
</tr>
<tr>
<td>Dry OFMS</td>
<td>6450</td>
<td>-2,153</td>
<td>-1,904</td>
<td>4,297</td>
<td>4,546</td>
</tr>
<tr>
<td>Moist OFSS</td>
<td>22</td>
<td>+1,953</td>
<td>+961</td>
<td>1,975</td>
<td>983</td>
</tr>
<tr>
<td>Moist OFMS</td>
<td>5153</td>
<td>-2,199</td>
<td>-1,207</td>
<td>2,954</td>
<td>3,947</td>
</tr>
<tr>
<td>Cold OFSS</td>
<td>25</td>
<td>+221</td>
<td>+217</td>
<td>245</td>
<td>242</td>
</tr>
<tr>
<td>Cold OFMS</td>
<td>422</td>
<td>-221</td>
<td>-217</td>
<td>201</td>
<td>205</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12915</strong></td>
<td><strong>-540</strong></td>
<td><strong>-540</strong></td>
<td><strong>12,405</strong></td>
<td><strong>12,407</strong></td>
</tr>
</tbody>
</table>

The predicted reduction of total old forest in Alternatives B and C (500 acres). The extra 40 acres is an allowance for potential mortality from landscape burning. That is why the +/- conversions from OFMS to OFSS are not equal. When the burning occurs, plans include modifications to adjust operations such that areas of elk cover would be protected and thus, most of the old forest would as well. Based on past burning in similar areas, resulting small areas of high burn severity are normal, but at a very small scale if at all. If this occurs, rich snag habitat would be created in these areas and diversity of habitat would increase.

Canopy would be reduced in some of the connective corridors between old forest stands via tree cutting, small diameter thinning, and/or landscape burning. Alternative B would affect 545 acres of connective forest and Alternative C would affect 190 acres of connective forest. These areas would be thinned, but are noted as ‘high retention’ areas; in other words thinning would be light and the corridor would continue to provide for movement of various wildlife species associated with late and old structural conditions.
Proposed temporary roads considered ‘new’ (not on old roadbed) would remove trees and vegetation within old forest in both alternatives. Alternative B proposes 3 miles and Alternative C proposes 1.7 miles of new temporary road within old forest. The effects to vegetation are accounted for in the prior effects stated for tree cutting because all of the old forest stands impacted by temporary roads are also within cutting units. All temporary roads would be re-vegetated after use. Since these roads would be closed to the public, access to old forest stands for activities such as firewood cutting would not increase.

Other proposed activities such as road maintenance and removal of danger trees along roads would have little to no effect to old forest stands, because only trees adjacent to roads would be affected and interior old forest would not.

**American Marten**

In the remainder of the project area, nearly all marten habitat that is not protected by MA-C1 (Dedicated Old Growth, MA-C5 (Riparian) and Asotin Creek Roadless Area designations would be affected by cutting activity proposed in Alternative B. Within MA-C4, 100 percent of the marten habitat would be affected by tree cutting (1,950 acres). Marten habitat that would be hand thinned and underburned is predicted to remain old forest multistory, and would continue to provide habitat for marten.

The majority of effect from Sunrise project would be multi-strata moist old forest converting to single-stratum moist old forest. The regeneration acres (Table 12) are prescriptions that would not remove large trees or change the stand structure to something other than old forest. Minimum down wood and all large snags would be retained, and large trees (>21 inches dbh) would not be removed. These stands would still qualify as marten foraging habitat, but modifications to stand structure could make them unsuitable for winter denning in the short term.

Since marten home ranges typically include both source habitat as well as foraging areas and non-habitat, the project area may continue to provide enough habitat for a reproducing pair. With Alternative B, Management Area C-4 would no longer provide high quality habitat. Quality source habitat would be available in the roadless area, and marten could continue to use managed areas to find prey. In general, Alternative C would treat half as much marten habitat as Alternative B, and would provide a balance between maintaining marten habitat and reducing fuels.

Past timber harvest and road construction has occurred throughout the project area, which is reflected in the existing condition. The Asotin Creek Prescribed Fire project boundary only contains 42 acres of marten habitat which will not likely be affected. The 44 Road Grapple project would not occur within marten habitat. Forest recreation activities such as hunting, hiking, sightseeing, and berry picking take place during the day time when marten are less active. Open road densities would remain low, which restricts the amount of human disturbance. These and other activities such as livestock grazing, future seeding and planting, weed treatments, and road projects in combination with proposed activities in this EIS would have no cumulative effects to marten habitat.

**Dead and Down Tree Habitat**

Hand thinning and pruning would not affect snag densities, however follow up burning could reduce snags and down wood, while also causing some new tree mortality. There could be a short term reduction but a mid- to long-term increase in dead wood habitat.
Thinning and selection harvests should accelerate the development of large trees in the project area. Over the long term, large diameter snags and down logs would be recruited from these trees. Timber harvest and fuel reduction activities would reduce ladder fuels and tree crown biomass, reducing the potential for hot, crown fires to occur in the project area. The supply of snags would be less subject to “boom and bust” cycles and should become more stable and continuous over time. The average snag diameter should slowly increase.

Following the project there would be a short to mid-term reduction in snag recruitment in harvest units, since logging would “capture” much of the potential habitat that would have resulted from density or age dependent tree mortality factors. Most of this potential habitat would have consisted of smaller diameter trees. With all logging methods, an occasional green reserve tree might be mechanically injured during felling and skidding operations. These tree injuries could provide forest pathogens access into the tree bole, potentially resulting in defective live trees or snags over a few years. In addition, many of the mechanical units would also be burned and create new snags.

Current and future snag and down wood habitat could be provided in a variety of ways within mechanical harvest units. In general, large trees and snag retention would be emphasized. Large snags would be left standing except for incidental snags that need to be felled for safety purposes, for skyline corridors, or during clearing for temporary roads. Large diameter snags are emphasized because they are in shorter supply, stand longer, and are used by more wildlife species than smaller snags.

Under Alternative B; mechanical activities could result in some short term snag loss on 5,520 acres, or 11.4 percent of the forest in the watershed (48,270 acres on FS). Again, all existing large snags would be retained wherever possible. Under Alternative C, mechanical activities could result in some snag loss on 2,555 acres, or 5 percent of the forest in the watershed.

Overall there is expected to be a net loss of down wood and a net increase in snags, due to fire mortality. Fuels would be consumed in relation to their diameter and moisture content.

Structural habitat for cavity excavating birds could be slightly reduced at the stand scale, but measures taken to provide current and future habitat (mentioned above) would contribute to long term dead wood habitat needs on the forest. The improvement of long term forest resiliency would provide snag and down wood habitat over the long term. In general, managing forests within or towards the historical range of variability should provide habitat for a wide range of cavity excavator species. Managing within Eastside Screens direction also ensures that the old forest habitat that many primary cavity excavators utilize remains available. The Asotin Creek burn would affect an additional 7,475 acres within the watershed. This is the size of the area, but only a portion would actually burn. The Asotin Creek burn area is a mix of grassland and timber, with a variable mosaic of burn severity and intensities expected.

Timber sales associated with the South George EIS total 3,450 acres of treatment in this same watershed. South George units in combination with mechanical treatments in Sunrise project, Alternatives B and C would affect 19 and 12 percent of total forest respectively. At the forest scale, the effect is very small (<1%)

*Pileated Woodpecker*

Pileated woodpecker habitat that would be hand thinned and underburned is predicted to remain in the old forest or understory reinitiation stand structure, and would continue to provide habitat.
The majority of effect from Sunrise project would be multi-strata old forest converting to single-stratum old forest; both of which can be source habitat for pileated woodpeckers. Minimum down wood and all large snags would be retained, and large trees (> 21 inches dbh) would not be removed.

Thinning and selection harvests should accelerate the development of large trees in the project area. Over the long term, large diameter snags and down logs would be recruited from these trees. The supply of snags would be less subject to “boom and bust” cycles and should become more stable and continuous over time. The average snag diameter should slowly increase.

Landscape fire could reduce snags and down wood, but small scale torching would result in snag and down wood recruitment. Overall there is expected to be a net loss of down wood and a net increase in snags, due to fire mortality.

Structural habitat for pileated woodpecker could be slightly reduced at the stand scale, but measures taken to provide current and future habitat would contribute to long term dead wood habitat needs on the forest. The improvement of long term forest resiliency would provide snag and down wood habitat over the long term. In general, managing forests within or towards the historical range of variability should provide habitat for a wide range of cavity excavator species. Managing within Eastside Screens direction also ensures that the old forest habitat for pileated woodpecker remains available.

The Asotin Creek Prescribed Fire project could affect an additional 1,500 acres of pileated woodpecker habitat. These are for the most part timber stringers in draws and along North Fork Asotin Creek. Burning effects are expected to be minimal in these areas, as the objective is to burn the extensive grasslands in the area.

About one mile of the 44 Road Grapple project is immediately adjacent to pileated woodpecker habitat. There would be minimal encroachment of the project into these stands, if any, because of the limited distance the grapple piling will occur from the road.

Open road densities would remain low, which reduces the potential for snag loss from personal use firewood cutting. Other activities such as livestock grazing, future seeding and planting, weed treatments, recreational uses and road projects in combination with proposed activities in this EIS would have no cumulative effects to pileated woodpecker.

**Three-Toed Woodpecker**

Alternative B would reduce tree density on about 64 percent (3,000 acres) of the three-toed woodpecker habitat. Alternative C would reduce tree density on about 30 percent (1,400 acres) of the three-toed woodpecker habitat in the project area.

Three-toed woodpeckers would likely continue to use post-harvest stands that retain at least 50 percent canopy cover; this would be the case for about 600 activity acres in Alternative B and 300 acres in Alternative C.

The majority of treatments would be a moderate or mixed amount of cover retention (< 50% canopy cover retained). Generally these treatments would reduce habitat in the short term but create more resilient stands in the long term. Increases in lodgepole pine would be expected.

Within the moderate and mixed retention prescription, Alternative B would change 300 acres of three-toed woodpecker habitat to a stand initiation structure, with 75 acres of that being the
lodgepole pine cover type (units 61 and 63). Only 26 acres of currently OFMS lodgepole pine would be treated, and it would change to an OFSS stand structure; which may also be used by three-toed woodpeckers.

Landscape prescribed fire would potentially affect an additional 1,400 acres of three-toed woodpecker habitat. Any mortality associated with burning would probably enhance foraging opportunities.

Foraging habitat for three-toed woodpeckers would remain available on over 2,000 acres with Alternative B and 3,570 acres with Alternative C.

Recent fires on the Pomeroy Ranger District (School, Columbia Complex, Grizzly Bear Complex) have created large amounts of dead tree habitat in adjacent areas. Other ongoing activities such as the Asotin Creek burn, livestock grazing, and recreation uses would not affect three-toed woodpecker habitat.

**Birds of Conservation Concern**

The appropriate state Bird Conservation Plan and USFWS Birds of Conservation Concern species list (USFWS 2008) for the project area were reviewed. The effects on those species and habitats that may occur in the Sunrise project sites are disclosed below (Table 3-39.)

<table>
<thead>
<tr>
<th>Bird Species</th>
<th>Effects of Alternative A (No Action) to Habitat</th>
<th>Effects of Alternatives B and C to Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammulated owl</td>
<td>Mature ponderosa pine and Douglas-fir with open canopy would continue to be scarce.</td>
<td>Habitat would be enhanced through understory thinning and burning.</td>
</tr>
<tr>
<td>White-headed woodpecker</td>
<td>Ponderosa pine with open understory would continue to be scarce.</td>
<td>Ponderosa pine habitat would be enhanced through understory thinning and burning.</td>
</tr>
<tr>
<td>Lewis' woodpecker</td>
<td>Habitat would continue to be present.</td>
<td>Habitat would be enhanced through understory thinning and burning, and retention of snags and down wood.</td>
</tr>
<tr>
<td>Williamson's sapsucker</td>
<td>Deciduous forest is limited but conifer habitat would continue to be present.</td>
<td>Habitat would be reduced due to removal of existing and future decaying trees, potentially enhanced through burning and maintenance of snags and down wood.</td>
</tr>
<tr>
<td>Olive-sided flycatcher</td>
<td>Habitat would continue to be present.</td>
<td>Landscape burning would enhance habitat. Thinning would create more diverse stand conditions, retaining largest trees and snags. Forest gaps and forest edge habitat would enhance foraging opportunities.</td>
</tr>
<tr>
<td>Calliope hummingbird</td>
<td>Habitat would continue to be present.</td>
<td>Habitat would continue to be present and unaffected by proposed activities.</td>
</tr>
</tbody>
</table>

**Threatened, Endangered, and Sensitive Wildlife and Invertebrate Species**

**Wolverine**

Management actions such as timber harvest, prescribed fire, and grazing, are not considered a threat to this species (USFWS 2013). Because wolverines are dependent on deep snow cover that persists into the month of May for successful denning, the primary threat is from habitat and
range loss due to climate warming (USFWS 2013). Since denning is not expected in the area, there would be no effects to reproduction.

Timber harvest and underburning could lead to improvements in green forage production and palatability as well as berry production. Prey species and scavenging opportunities would likely remain the same. Open road densities would remain low, which restricts the amount of human disturbance. Forest corridors would be maintained.

**Determination**

Because wolverines are not known to reside in the area, foraging and movement potential would remain about the same, and the project does not have denning habitat, implementation of either Alternative B or C would have no effect to North American wolverine.

**Gray wolf**

Timber harvest, mechanical fuels treatments, and low-intensity prescribed fires would reduce ground fuels and continuous fuel ladders. Future wildfires that occur in treated stands should burn cooler and would be less likely to ascend into the crowns of over-story trees. Thus, the risk of a hot crown fire removing forest cover over large areas would be reduced. Where low-intensity, prescribed fire is employed, decadent vegetation on upland shrubs and grasses would be removed. Forage plants for big game should respond to these burns with robust basal sprouting and an increase in palatability for several years following treatment. In short, the proposed activities are not expected to reduce prey availability. See the elk section in this chapter for further information.

If a den or rendezvous site is identified prior to or during project activities, the Forest Service would consult with Washington Department of Fish and Wildlife personnel to determine if seasonal restrictions or other requirements are necessary. Because these sites are difficult to locate and can change yearly, this would need to be assessed on an ongoing basis throughout the life of the project.

In the experience of regional and local biologists, timber harvest and associated activities has thus far had no evident impact to wolves on the Umatilla Forest (Berkley and Hickman 2015). The wolf population continues to grow (WDFW et al. 2017).

**Determination**

Since denning is not occurring within the project area, road densities would not change, and prey availability would remain high, the proposed activities in combination with other past, present, and reasonably foreseeable future actions would have no impact to gray wolf.

**Preble’s shrew**

Project requirements such as no-harvest buffers adjacent to springs, wetlands and stream habitats would reduce potential impacts to Preble’s shrew. Retention of down logs would help maintain moist microsite conditions. Effects to riparian and wet areas is unlikely. There is a slight chance that individual shrews could be killed by heavy equipment and burning operations. Timber harvest and fuels reduction would also remove or reduce the concealing cover of live ground vegetation and leaf litter over at least the short-term. Some down logs would be disturbed or removed. In the mid to long-term, timber harvest and landscape burning would promote the growth of dense understory vegetation by reducing competition with conifers for sunlight, water, and soil nutrients. These increases in herb and shrub growth could result in an increased abundance and diversity of insect prey.
Determinations

The Sunrise project may impact individual Preble’s shrews, but would not likely cause a loss of viability of the species or a trend toward federal listing.

**Rocky Mountain bighorn sheep**

There would be little to no effect to bighorn sheep habitat from timber harvest and other tree cutting. No disturbance would be expected since sheep are typically not near the forest stands or roads. The only activity affecting bighorn habitat would be landscape prescribed fire.

**Determination**

Landscape prescribed fire would likely improve bighorn sheep habitat for a few years. The proposed activities would have a beneficial effect and therefore, the project may impact Rocky Mountain bighorn sheep, but would not likely cause a loss of viability of the species or a trend toward federal listing.

**Little brown myotis**

Roosting habitat for bats could be slightly reduced at the stand scale, but measures taken to provide current and future habitat would contribute to long term snag habitat. Large tree and snag retention would be emphasized. Large snags would be left standing except for incidental snags that need to be felled for safety purposes, for skyline corridors, or during clearing for temporary roads.

Thinning and selection harvests should accelerate the development of large trees in the project area. Over the long term, large diameter snags and down logs would be recruited from these trees. Timber harvest and fuel reduction activities would reduce ladder fuels and tree crown biomass, reducing the potential for hot, crown fires to occur in the project area. The supply of snags would be less subject to “boom and bust” cycles and should become more stable and continuous over time. The average snag diameter should slowly increase.

Landscape fire would be prescribed in stands that are not being harvested, both within and outside the Asotin Creek Roadless Area. Although a loss of snags is expected with prescribed burning, small scale torching would result in snag recruitment. Overall there is expected to be a net increase in snags, due to fire mortality.

For more information about effects to snags, see the Dead and Down Tree Habitat section of the wildlife report.

**Determination**

Threats to this species are primarily white-nose syndrome and wind turbines. Large snag habitat would continue to be available for roosting bats. Therefore the Sunrise project may impact individual little brown myotis, but would not likely cause a loss of viability of the species or a trend toward federal listing.

**Bald eagle**

Use of the area by bald eagle is incidental. If this species were in the area during project activities, increased human presence and noise could cause it to move a short distance. Smoke from prescribed fires may discourage use of the area, but this is limited in duration.
**Determination**

Bald eagle use of the area is incidental and there are no nearby nests. Since it is highly unlikely that individuals would be in close proximity during project activities, there would be no impact to bald eagle.

**Great Gray Owl**

Opening up old forest multi-strata (OFMS) stands to old forest single-stratum could reduce the attractiveness of the stands for great gray owl nesting, but currently there is more than twice the amount of OFMS in the area than there should be. Reducing this condition is necessary to insure the long term health of the forest. There would be little to no loss of large trees or snags (>21 inches dbh) and no net loss of old forest. The roadless area as well as a substantial Dedicated Old Growth area would provide large areas of undisturbed habitat.

Landscape burning would like enhance great gray owl habitat by maintaining grassy openings and stimulating plant species used by prey such as voles and other rodents.

**Determination**

Based on the lack of great gray owl observations in the project area, and lack of known nesting on the Umatilla forest, the Sunrise project would have no impact to great gray owl. If a nest is found at any time, it would be protected as described in the project design criteria (Chapter 2).

**Northern goshawk**

Within cutting units, the primary effect to potential goshawk habitat would be changing stand structure from OFMS to OFSS. Generally canopy cover would be reduced to the point that goshawks would not be drawn to these stands for nesting. Hand thinning and mechanical units with high cover retention would retain large trees for future nesting, but the understory would probably be altered enough that prey habitat would be reduced. Landscape burning would have a lesser effect, with variable effects to trees and understory stand components.

Alternative B would reduce canopy cover below 50% on about 1,700 acres of potential goshawk habitat, while Alternative C would do the same on about 700 acres.

Additional landscape burning would affect 2,400 acres, although fire would be patchy so the actual acres would be less. This includes riparian areas which would have minimal fire effects.

This leaves 5,400 to 7,000 acres of well-connected and well-distributed potential goshawk habitat in Alternative B (depending on fire activity), and 6,400 to 7,000 acres in Alternative C. The best habitat in riparian areas would not likely be affected.

**Determination**

The Sunrise project may impact individual northern goshawk, but would not likely cause a loss of viability of the species or a trend toward federal listing. If a nest is found at any time, it would be protected as described in the project design criteria (Chapter 2).

**Lewis’s woodpecker and White-headed woodpecker**

Both Alternatives B and C would potentially create healthier stands and more open conditions on about 1,800 acres of old forest multi-strata ponderosa pine stands. This would occur via thinning (800 acres) or burning (1,000 acres). Areas not being thinned, but within the landscape burning...
perimeter (1,000 acres) may or may not be affected depending on site conditions and management of the burn.

About 50 acres of OFMS pine would have a regeneration prescription but would still qualify as OFSS post-treatment (Units 130 and 226). All of these areas would retain large trees and snags.

For more information about project effects to snags, see the Dead and Down Tree Habitat section of the wildlife report.

**Determination**
Lewis’ woodpecker and white-headed woodpecker habitat would likely be improved with both action alternatives in the long term. Therefore the proposed project may impact Lewis woodpecker and white-headed woodpecker, but is not expected to cause a loss of population viability or result in a trend toward federal listing.

**Green-tailed towhee**
The most important management consideration for the green-tailed towhee probably is the maintenance of habitat heterogeneity, with respect to species composition, vigor, cover, and age structure of shrubs, and the prevention of invasion by non-native annual grasses (Dobbs 2006). Activities that promote species-rich shrub habitats with high shrub vigor should benefit green-tailed towhee (NatureServe 2017). Towhees can benefit from burns, timber harvest, and other management activities where post-fire or post-harvest habitats develop into brush fields (NatureServe 2017). Restoration of natural disturbance regimes may minimize unnaturally high levels of habitat alteration due to uncharacteristic fires.

Proposed activities would likely have a beneficial effect to habitat for green-tailed towhee. Burning is most commonly done in the fall and should have no effect to breeding birds if they are present. Controlled burns typically invigorate shrub growth. Timber management activities would reduce the chance for uncharacteristic wildfire, as well as open canopy up and allow for more shrub growth.

**Determination**
The proposed activities would have an overall beneficial effect and therefore, the project may impact green-tailed towhee, but would not likely cause a loss of viability of the species or a trend toward federal listing.

**Mountain quail**
If present, smoke and fire may displace quail temporarily but they would eventually return to post-fire habitat. Landscape burning may reduce shrubs that quail use for cover in the short term, but increase in the mid to long term. The shrubs and grasses will often be stimulated by fire and grow with more vigor and improve the overall habitat quality for quail. Quail habitat in riparian areas would generally not be affected. Timber removal and tree thinning could also create early successional-stage shrub vegetation in the short term.

**Determination**
The proposed activities would have an overall beneficial effect and therefore, the project may impact mountain quail, but would not likely cause a loss of viability of the species or a trend toward federal listing.
**Rocky Mountain tailed frog**

Timber management activities would not affect riparian areas, and thus would not directly affect tailed frogs. The stream environment is not expected to be disturbed. Indirectly, any changes to water temperature or stream quality could affect tailed frog reproductive success. No effects to water temperature and channel morphology are expected. There may be short term, slight effects to sediment levels in some area streams due to thinning followed by prescribed burning (Hydrologist report).

Landscape fire would be allowed to back into some riparian areas. Fire and smoke could temporarily cause terrestrial tailed frogs to move out of the area or stay in the water, but should cause no harm. Tailed frogs in the water would not be affected by low intensity fire.

**Determination**

The project may impact Rocky Mountain tailed frog, but would not likely cause a loss of viability of the species or a trend toward federal listing. Effects from this project are expected to be slight to none since no activities are proposed within riparian areas and effects to water quality would be minimal.

**Invertebrate species**

Heavy equipment operation and prescribed burning could directly kill individual sensitive invertebrates; particularly the less mobile species such as the mollusks or the larvae of butterflies. Food plants could be crushed or removed. Down logs which provide essential habitats for the mollusks could be removed, broken down by heavy equipment operation, or charred in areas that are under-burned.

Off-setting these potential adverse effects, timber harvest would create openings and edge habitat that would provide some species with increased flowering plants. Project design criteria require protection of rock outcrops, talus, meadows and riparian areas. PACFISH buffers would protect springsnail and other species that are closely associated with water sources.

Down log habitat would be reduced, but not in wet areas or in any of the aforementioned habitats. The prescribed amount of large down wood (derived from a natural range) that could harbor sensitive snails would be retained within harvest units. Burning in moist or wet areas would cause minimal or no changes to down wood.

Proposed landscape burning could affect ravines, open ridges and hillsides. This is a natural part of the ecosystem, but is applied in a controlled manner. Burn plans include specific objectives and controls, with considerations for topography, wind pattern, amount of burned area, etc. Effects would be much less than if a wildfire occurred.

Western dwarf mistletoe has not been reported in the ponderosa pines in the analysis area. Areas with the most pine and highest potential for western dwarf mistletoe would see primarily small diameter hand thinning and underburning. Ponderosa pine stands would be improved overall, providing habitat (host plants) longer. Since Johnson’s hairstreak are not documented in or near the project area, and most potential habitat would have minimal disturbance, no effects to Johnson’s hairstreak would be expected.

**Determination**

Based on the short to long-term project effects described earlier, and the lack of evidence indicating these species are present, the alternatives as proposed may impact individuals, but
would not likely cause a trend to federal listing of any sensitive invertebrate species (Table 3-40.)

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada lynx</td>
<td>No Effect</td>
<td>No Effect</td>
<td>No Effect</td>
</tr>
<tr>
<td>Yellow-billed cuckoo</td>
<td>No Effect</td>
<td>No Effect</td>
<td>No Effect</td>
</tr>
<tr>
<td>North American wolverine</td>
<td>No Effect</td>
<td>No Effect</td>
<td>No Effect</td>
</tr>
<tr>
<td>Gray wolf</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Preble’s shrew</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Rocky Mountain bighorn sheep</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Mountain goat</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Townsend’s big-eared bat</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Little brown myotis</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bald eagle</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Great gray owl</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Northern goshawk</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>White-headed woodpecker</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Lewis’ woodpecker</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Green-tailed towhee</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Mountain quail</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td><strong>Amphibians</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rocky Mountain tailed frog</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td><strong>Molluscs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fir pinwheel</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Columbia Gorge oregonian</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Pristine springsnail</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Humped coin</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Thinlip tightcoil</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Shiny tightcoil</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Salmon coil</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td><strong>Butterflies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Basin fritillary</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Meadow fritillary</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Johnson’s hairstreak</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td>Barry’s hairstreak</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Lustrous copper</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
<tr>
<td><strong>Other Insects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia clubtail</td>
<td>No Impact</td>
<td>No Impact</td>
<td>No Impact</td>
</tr>
<tr>
<td>Western bumble bee</td>
<td>No Impact</td>
<td>May Impact</td>
<td>May Impact</td>
</tr>
</tbody>
</table>

**No Effect:** no effect on a proposed or listed species or critical habitat; **No Impact:** no impact to R6 sensitive species individuals, populations, or their habitat; **May Impact:** may impact sensitive species, but will not cause a loss of viability or trend toward federal listing.
Findings of Consistency
All alternatives would be consistent with Forest Plan standards and guidelines, because they would meet project design features set for the project, meet standards and guidelines for affected land management allocations, and provide for viable populations of wildlife species. All alternatives would provide for diversity of plant and animal communities in the Sunrise project area, based on the suitability and capability of the land therein. All project alternatives are consistent with the Endangered Species Action, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Facilitation of Hunting Heritage and Wildlife Conservation Executive Order.

3.9 Fisheries

Introduction
Special attention is paid to fisheries in the Pacific Northwest. The region is home to many iconic aquatic species, some of which are threatened or endangered. Therefore fisheries require special attention and additional analysis.

Regulatory Framework
The Sunrise Vegetation and Fuels Management Fisheries Specialist Report was prepared in accordance with the following guidance and direction:

- Section 7(a)(2) of the Endangered Species Act of 1973 (as amended),
- Magnuson-Stevens Fishery Conservation and Management Act (§ 305(b)) and it’s implementing regulations (50CFR § 600).
- National Forest Management Act of 1976
- Clean Water Act of 1972

Threatened, Endangered and Sensitive (TES) Fish and Habitat
Snake River Basin (SR) steelhead, Bull trout, Snake River Spring/Summer Chinook salmon and their designated critical habitats and salmon essential fish habitat are the only species and habitats listed under the Endangered Species Act (ESA), which are found in or adjacent to the project area. Information on the Regional Forester’s sensitive species suspected or known to occur on the Umatilla National Forest can be found in Table 3-43.

Management Indicator Species (MIS)
Steelhead trout (anadromous) and resident rainbow trout (aka Redband trout) are the designated aquatic Management Indicators Species (MIS) for the Umatilla National Forest. The Forest Plan was amended in 1995 by PACFISH which incorporated standards and guides to allow for near-natural rates of habitat restoration, and avoid adverse effects to listed species and their Designated Critical Habitats. Streams surveys and broadscale efforts, i.e. PACFISH/INFISH Biological Opinion, (aka “PIBO”) monitoring, are in place to collect data and monitor habitat conditions.

Snake River Basin steelhead and their Designated Critical Habitat
Wild steelhead and resident interior Columbia Basin redband trout in the analysis area, are the anadromous and resident forms respectively, of the same salmonid subspecies (*Oncorhynchus mykiss gairneri*). Redband trout are another name for native resident rainbow trout in the Interior Columbia River Basin and are indistinguishable visually from the anadromous form as juveniles.
Steelhead rear in freshwater streams for their first 1 to 3 years prior to smolting. They then migrate to the ocean where they can spend up to 3 years before returning to their native freshwater stream to spawn. Unlike Pacific salmon, steelhead are iteroparous, meaning they do not necessarily die after spawning and are able to spawn more than once, although this varies among runs.

**Methodology**

For this document, the environmental baseline discussion and discussion of effects use FS habitat stream survey data and WDFW stream survey data as well as GIS analysis and the Interior Columbia Basin Ecosystem Management Project (ICBEMP) summary values (McKinney et al. 1996, see table 11) as directed under ICBEMP memorandum FS agreement No. 03-RMU-11046000-007, and reports in published scientific literature. Water temperature data is referenced from the Umatilla National Forest monitoring records. The seven-day moving maximum and average summer time water temperatures are measured. Stream surveys follow the Region 6 Level II stream survey protocol (following a modified Hankin and Reeves 1988 protocol).

The surveys were conducted to document stream conditions and establish a baseline. Surveys have been completed and updated for most major streams in the Project Area.

These habitat parameters are specifically addressed as PACFISH Riparian Management Objectives (RMO’s) (referencing Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin, USDA Forest Service, 1994), Please see the Fisheries Specialist Report for further details.

Under the Section 7 Habitat Monitoring Protocol for the Upper Columbia River Basin (USDA 1994), PACFISH RMO’s are intended to apply to fish bearing Rosgen (1996) C-type channels and are meant to describe good fish habitat. Table 8, above, has a list of streams and their associated Rosgen stream channel type. These types of channels are most commonly found in low-gradient channels in wide alluvial valley bottoms. For example, monitoring protocol for determining pool frequency requires count of only pools greater than 1 meter (~3 feet) deep in low gradient (1% -2%) stream channels.

Streams within or adjacent to the analysis area that do not fit these criteria include Cougar Creek, Lick Creek, NF Asotin Creek, Middle Branch of NF Asotin Creek and SF of NF Asotin Creek. These Streams are more representative of a Rosgen Type B stream channel. Because of this, ICBEMP pool frequencies are more applicable to these streams than the PACFISH standard. ICBEMP pool frequency values are more representative of stream capabilities within the analysis area.

**Affected Environment**

The Sunrise Project is proposed in the headwaters of the North Fork Asotin Creek Subwatershed (HUC 170601030201) and Lick Creek Subwatershed (HUC 170601030202) both of which are part of the George Creek – Asotin Creek Watershed (HUC 1706010302).

The George Creek – Asotin Creek Watershed is part of the Lower Snake - Asotin Sub-basin and the Lower Snake Basin, a tributary to the Mid-Columbia River. The watershed area is approximately 208,267 acres, of which 63,163 acres (30 percent) are managed by the US Forest Service (USFS). Please See below.
The George Creek – Asotin Creek Watershed will be the analysis area for cumulative effects on Snake River Basin steelhead, Snake River spring Chinook, Bull trout and their Designated Critical Habitats. The same watershed will be the analysis area for the cumulative effects on Essential Fish Habitat. The George Creek – Asotin Creek Watershed contains the Sunrise Project area. Table 3-42 shows acreage of the Sunrise Project area within the watershed.

### Table 3-41. Management of Watershed affected by the Sunrise Project

<table>
<thead>
<tr>
<th>Manager</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Forest Service (Umatilla NF)</td>
<td>63,163</td>
<td>30%</td>
</tr>
<tr>
<td>Other (BLM, Private and State)</td>
<td>145,104</td>
<td>70%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>208,267</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 3-42. Project Area acreage within the watershed

<table>
<thead>
<tr>
<th>Watershed Name (HUC)</th>
<th>Watershed Size (acres)</th>
<th>Project Acres in Watershed</th>
<th>Watershed in Project Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>George Creek – Asotin Creek Watershed</td>
<td>208,267</td>
<td>32,000</td>
<td>15.3%</td>
</tr>
<tr>
<td>(HUC 1706010302)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Indicators

Within the George Creek and Asotin Creek watersheds there is 115.2 miles of stream occupied by steelhead, with 17.6 miles located within the project area. Steelhead in the analysis area display a broad life history pattern of spawn timing typically called summer-run. Steelhead spawning occurs between March and May. Prior to spawning, maturing adults hold in pools or in side channels to avoid high winter flows. Typically, they spawn in stream reaches with a moderate to high gradient. Fry typically emerge between April and June. Migration to the ocean typically occurs at age 2 for wild summer steelhead, while most hatchery smolts migrate at age 1 (Carmichael and Taylor, 2009).

The steelhead population utilizing the Sunrise Project area is part of the Lower Snake Major Population Group (MPG), within the Snake River Basin Steelhead DPS. Figure 3-8 shows the Steelhead distribution within and adjacent to the Sunrise project area.
Designated critical habitat for Snake River Basin Steelhead includes all rivers and stream reaches accessible to steelhead below long-standing natural barriers (*Federal Register* Vol. 70 (52630); September 2, 2005). There are approximately 8.9 miles of designated critical habitat for Snake River Basin Steelhead within the project area.

**Snake River Spring Chinook salmon and their Designated Critical Habitat**

Chinook salmon are anadromous, living part of their life in salt water while breeding in fresh water; and semelparous, reproducing only once in a lifetime. Biologists recognize different seasonal (i.e., spring, summer, fall, or winter) "races" or "runs" in the Chinook salmon migration from the ocean to fresh water.

Spring/summer-run Chinook salmon from the Snake River basin exhibit stream-type life history characteristics. The spring-run Chinook salmon return to the Columbia River from the ocean in early spring and pass Bonneville Dam beginning in early March and ending the first week of June. The summer-run Chinook salmon return to the Columbia River from June through August. Returning fish hold in deep mainstem and tributary pools until late summer, when they emigrate up into tributary areas and spawn. In general, Snake River Basin spring-run Chinook salmon tend to spawn in higher-elevation reaches of major Snake River tributaries in mid- through late August. Snake River Basin summer-run Chinook salmon spawn approximately one month later than spring-run fish and tend to spawn lower in the Snake River Basin drainages, although their spawning areas often overlap with spring-run spawners.
The stream-type life history may be adapted to select spawning and rearing areas that are consistently productive with limited susceptibility to dramatic changes in water flow. The eggs that Snake River spring and summer Chinook salmon deposit in late summer and early fall incubate over the following winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, overwinter, and typically migrate to sea in the spring of their second year of life, although some juveniles may spend an additional year in fresh water. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. Most of the fish spend two or three years in the ocean before returning to tributary spawning grounds primarily as 4- and 5-year-old fish. A small fraction of the fish spend only one year in the ocean and return as 3-year-old “jacks,” heavily predominated by males (Good et al. 2005).

The Snake River spring/summer Chinook salmon was listed as Threatened under the Endangered Species Act on April 22, 1992 (50 FR 37160). Critical habitat was designated for Snake River spring/summer Chinook salmon on December 28, 1993 (58 FR 68543) and revised October 25 of 1999 (64 FR 57399). Although Designated Critical Habitat is not mapped for Snake River Spring/Summer Chinook salmon, it is described in the narrative or rule 64 FR 57399. Critical Habitat includes those waters that are accessible upstream of occupied habitat. These listings decisions were reaffirmed in 2005 (Good et al. 2005; 50 FR 37160).

Snake River spring/summer Chinook salmon are found within and adjacent to the Sunrise Project boundary. They are known to occupy approximately 5.4 miles of NF Asotin Creek within the Project boundary and can also be found in downstream of the project area in NF Asotin Creek and mainstem Asotin Creek. Due to few adult spawners returning to Asotin Creek, the
Interior Columbia Technical Review Team considers the Asotin Spring Chinook population to be functionally extinct.

![Figure 3-10. Chinook salmon distribution within and adjacent to the Sunrise Project](image)

**Essential Fish Habitat**

The federal Magnuson-Stevens Act (MSA) requires analysis for effects to Essential Fish Habitat (EFH) specifically for Pacific salmon. Amendment 18, of the Pacific salmon Fisheries Management Plan, revises the description and identification of EFH for Pacific salmon managed under the FMP. Freshwater EFH, identified in Amendment 18 of the FMP, is described using fourth field hydrologic unit codes (HUCs).

EFH includes all streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the currently and historically accessible habitat to Pacific salmon species. The riparian zone adjacent to these waterways is also considered EFH. This zone is defined as shade, sediment, nutrient/chemical regulation, streambank stability, and LWD/organic matter.

The Sunrise project area falls within one HUC 8 (Lower Snake - Asotin) identified in the Pacific salmon Fisheries Management Plan as EFH and contains EFH for Chinook salmon.

**Bull trout and their critical habitat**

Bull trout (*Salvelinus confluentus*) are members of the Salmonidae family. They are often referred to as char, which is the common name for members of the genus *Salvelinus*.

In general, bull trout are a cold water species that inhabits Pacific slope drainages from northern California through British Columbia to extreme southeastern Alaska (Meehan and Bjornn 1991).
Natural climactic warming and loss of cold water habitats since the Pleistocene period exacerbated by effects of human activities have reduced their distribution (Cavender 1978).

GIS databases show Bull trout are known to occur in 78.4 miles of streams in the George Creek – Asotin Creek watershed. Those same streams are listed as Designated Critical Habitat (DCH) by the U.S. Fish and Wildlife Service. Of those occupied and DCH streams, approximately 14.8 miles are within the Sunrise project boundary.

**Redband/Rainbow Trout**

Interior Columbia Basin redband trout are a resident subspecies of *Oncorhynchus mykiss* found east of the Cascade Mountains in Oregon and Washington, in northern California, and in eastern British Columbia. Behnke (1979) noted two main evolutionary lines of the species dating back to the Pleistocene; the coastal rainbow trout west of the Cascades and the inland Columbia Basin redband trout east of the Cascades. Both of these evolutionary lines include steelhead populations of their respective areas. They are currently recognized as being two separate subspecies, with the natural break between them being the Cascades Mountains in Oregon.

Hatchery rainbow trout stocked for sport fisheries are typically produced from the coastal subspecies (*Oncorhynchus mykiss irideus*), and had been stocked in analysis area waters in earlier decades, but hatchery stocking in free-flowing streams has been discontinued in recent years. Absent genetic analyses to show dominant hatchery genetics, all resident *O. mykiss* in the analysis area are presumed to be *O. mykiss gairdneri*/interior Columbia Basin redband trout, particularly since the two subspecies display different patterns of coloration. Genetically pure populations of redband can generally be found isolated above migratory barriers where stocking has not occurred (Behnke 1979).

Redband trout require stream and riparian habitat conditions in the area favorable to spawning and rearing. Factors concerning their habitats include water temperature, water quality, timing and quantity of peak stream flows, and physical in-stream and riparian habitat characteristics. Good water quality is essential for spawning and rearing. Redband require similar in-stream habitat characteristics as other cool-water salmonids. A variety of habitat types are important in providing adequate habitats for all life stages.

GIS data show Redband/rainbow trout are present in 27.1 miles of streams within the Sunrise project boundary. Of those occupied streams, 3.2 miles are above physical barriers

**Regional Sensitive Invertebrate and Vertebrate Species**

A number of sensitive invertebrate and aquatic vertebrate species are known or suspected on the Umatilla National Forest. Table 3-43 describes their known or suspected presence in the analysis area.
Table 3-43. Regional Forester’s List of Sensitive Aquatic Invertebrate and Vertebrate Species Present or suspected on the Umatilla NF

<table>
<thead>
<tr>
<th>Regional Sensitive Aquatic Species</th>
<th>Habitat Description*</th>
<th>Habitat Present in Analysis Area</th>
<th>Species Present in Analysis Area</th>
<th>Known Current Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western ridged mussel (Gonidea angulata)</td>
<td>Occur in streams of all sizes of low to mid-elevation watersheds. Common in stable stream reaches, tolerant of fine sediments and occupy depositional areas.</td>
<td>Habitat likely present in NF Asotin Creek.</td>
<td>Assumed present within the analysis area although none have been found during stream surveys or project field visits.</td>
<td>Widely distributed west of the Continental Divide, CA to BC. It is mainly distributed east of the Cascades.</td>
</tr>
<tr>
<td>Shortface lanx (Fisherola nuttalli)</td>
<td>Occurs in large low to mid-elevation riverine habitats. Common in unpolluted, cold, well oxygenated, perennial streams with cobble-boulder substrate.</td>
<td>No</td>
<td>No</td>
<td>Found throughout the Snake River and the Mid-Columbia basin limited to large rivers.</td>
</tr>
<tr>
<td>Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi)</td>
<td>Cold clear, water, high mountain streams with variable habitat complexity</td>
<td>No</td>
<td>No</td>
<td>Found throughout the Mid-Columbia River Basin, NFJD and Upper John Day R. subbasins</td>
</tr>
</tbody>
</table>


**Westslope cutthroat trout**

Westslope cutthroat trout are considered a sensitive species on the Forest. The only known or suspected populations are located in high-elevation watersheds of the John Day River basin. There are no Westslope cutthroat trout located in the Sunrise project area and will not be discussed any further in this Fisheries Specialist Report.

**Western ridged mussel**

Western Ridged mussels (G. angulata) are filter feeders that consume phytoplankton and zooplankton suspended in the water. *Gonidea angulata* is a relatively slow growing and long lived species – perhaps living 20 to 30 years (COSEWIC 2003, Vannote and Minshall 1982). To reproduce, adult females release fertilized juvenile mussels, or glochidia, in packets called conglutinates. Glochidia attach to host fish for a period of weeks to months. Once glochidia are released, they attach to a fish host. In northern California, the release of glochidia apparently peaks in June, and the glochidia are probably excysted from fish primarily during the period from late June to late July (Spring Rivers 2007). *Gonidea angulata* is not known to occur in the Sunrise Project area.

**Shortface lanx**

*Fisherola nuttalli* is generally restricted to relatively large perennial streams ranging from 30-100 m (98-300 ft.) wide in the Columbia River Basin. Within such streams it is found primarily at the edges of rapids or immediately downstream from rapids in areas that have suitable substrate. This species requires clean, cold, well-oxygenated water with gravel, cobble, and boulder substrate. In an assessment of Hells Canyon Dam (Snake River, Idaho), *F. nuttalli* was found on cobbles in higher velocity areas of the stream much more frequently than any other mollusk species; this was considered to reflect the species’ preference to attach themselves to hard surfaces in high velocities to avoid competition with other species (Richards et al. 2005).
*Fisherola nuttalli* has not been found in areas with the following characteristics: slow flow; silt or mud substrates; extreme seasonal variations in discharge; an abundance of macrophytes (aquatic plants) or epiphytic algae; a bedrock substrate; or where dredging or mining occurs (Neitzel & Frest 1992; Frest & Johannes 1995; Frest 1999; Richards et al. 2005). The snails feed by scraping algae and diatoms from the surface of rocks and boulders.

Freshwater pulmonate snails generally reproduce sexually, laying their eggs from spring to fall in a gelatinous capsule attached to plants or stones. Egg capsules of *F. nuttalli* are usually laid on the undersides or sides of cobbles in protected areas where adults occur. *Fisherola* are hermaphrodites but do not appear to be self-fertilized, i.e. mating occurs between two individuals. Hatchlings are morphologically similar to adults, except that they lack a functional reproductive system. Young snails appear to grow rapidly and require only a few months to reach full size. Individual *F. nuttalli* generally live for only one year, as this species breeds once and dies afterwards (semelparous breeding) (comments by T. Frest in 5-year review and evaluation of Banbury Springs limpet, U.S. Fish and Wildlife Service 2006). Individuals are present year-round in the streams they inhabit, but are inactive during the winter. Dispersal of *F. nuttalli* occurs as snails crawl slowly across the substrate or are carried by the current.

*Fisherola nuttalli* was historically widespread, with populations scattered throughout the lower Columbia and Snake Rivers as well as some of their major tributaries, and was known from Washington, Oregon, Idaho, and Montana. It has also been documented in the Columbia River drainage in British Columbia, Canada, although its presence there was assumed based on the discovery of a shell (Clarke 1981). Prior to 1987, collections of *F. nuttalli* are reported from Columbia and Spokane Rivers in Washington; the Snake and Salmon Rivers in Idaho; the Deschutes River in Oregon; and the Kootenai River in British Columbia. Columbia River sites extended from Portland, Oregon, to the Hanford Reach in Washington. Most of these sites no longer have suitable *F. nuttalli* habitat due to the effects of damming, impoundment, pollution, and water withdrawals for irrigation (Neitzel & Frest 1992), although one occurrence is known in Oregon near the Bonneville Dam. This species is now presumed extirpated in Montana and British Columbia, although it may persist in the Okanogan River drainage in British Columbia (Stagliano et al. 2007).

Currently, large populations of *F. nuttalli* persist in only four streams: the lower Deschutes River, Oregon; the Okanogan River and the Hanford Reach of the Columbia River, Washington; and the Snake River in Oregon and Idaho. Additional small populations are found in Oregon in the John Day and Imnaha Rivers, and the lower Columbia River near Bonneville Dam; the Methow River, Washington; and the Grande Ronde River, Washington and Oregon (Neitzel & Frest 1992; Frest & Johannes 1995, 2000; Frest 1999; Richards et al. 2005; Idaho Conservation Data Center 2006). Many of these areas are on federal lands, including the Hanford Reach (Department of Energy); Deschutes Wild and Scenic River; Hells Canyon National Recreation Area; Okanogan, Gifford Pinchot, and Mt. Hood National Forests; and the Bonneville Power Administration. Shortface Lanx are not known to occur within or adjacent to the Sunrise Project area.
Environmental Consequences

Direct and Indirect Effects

*Alternative A (No Action)*

There are no direct or indirect effects under this Alternative. Under Alternative A of the Sunrise Project, the FS would not change management in the project area. There would be no proposed road maintenance/construction, harvest, thinning, prescribed burning or other associated activities. Therefore, there would be no mechanism for direct, indirect or cumulative effects to ESA listed fish species and their DCH, Essential Fish Habitat (EFH) or USFS R6 sensitive fish and aquatic invertebrates and their habitat.

Therefore, there would be no effect to Proposed, Endangered, and Threatened fish species and DCH or EFH and no impact to Sensitive fish and aquatic invertebrate species and their habitats considered in this analysis.

For additional information, see the Fisheries Specialists Report.

*Alternatives B and C*

**Snake River Basin steelhead and Designated Critical Habitat**

The steelhead population that inhabits the Sunrise project area is part of the Lower Snake River Major Population Group (MPG), within the Snake River Basin Steelhead DPS. They spawn and rear in 17.6 miles of stream within the George Creek – Asotin Creek watershed portions of the project area. There are 8.9 miles of designated critical habitat (DCH) for Snake River Basin steelhead within the project area.

SRB steelhead and their DCH may be indirectly affected by harvest, burning and road management activities, particularly where those activities occur within RHCAs. Project design criteria and BMP monitoring would ensure that the probability and magnitude of those effects remain both negligible and discountable. There would be no measurable cumulative effects to the species or to DCH. Therefore, the implementation of the Sunrise Vegetation and Fuels Management Project activities (harvesting, prescribed fire/fuels management and road management) under the Proposed Action alternative May Affect, Not Likely to Adversely Affect Snake River Basin steelhead and May Affect, Not Likely to Adversely Affect Designated Critical Habitat for SRB steelhead.

**Chinook salmon, Designated Critical Habitat and Essential Fish Habitat**

Snake River spring/summer Chinook salmon are found within the Sunrise Vegetation and Fuels Management project boundary. They can be found in approximately 5.8 miles of NF Asotin Creek within of the project area (Figure 3-10). Chinook salmon found in the project area are from the Asotin population of the Lower Snake River MPG. This MPG historically had two populations (Tucannon and Asotin populations). In 2011, the ICTR declared the Asotin population to be functionally extirpated. Designated critical habitat for the Snake River spring/summer Chinook salmon is not mapped but is described in narrative in the rule (64 FR 57399). Critical Habitat includes those waters that are accessible upstream of occupied habitat.

The Lower Snake - Asotin HUC contains EFH and is associated with the Snake River spring Chinook ESU. The project area contains approximately 5.8 miles of occupied EFH associated
Sunrise Vegetation and Fuels Project

with North Fork Asotin Creek. Chinook can also be found downstream of the project area in mainstem Asotin Creek.

Through the implementation of project design criteria and BMP monitoring, there would be no measurable direct, indirect or cumulative effects from the implementation of the Sunrise Vegetation and Fuels Management Project under the proposed action Alternative.

Therefore, implementation of the Sunrise Vegetation and Fuels Management Project activities (harvesting, prescribed fire/fuels management and road management) under the proposed action Alternative May Affect, Not Likely Adversely Affect SR spring/summer Chinook salmon or their Designated Critical Habitat and Will Not Adversely Affect Essential Fish Habitat for Chinook salmon.

**Bull trout and Designated Critical Habitat**

Bull trout are known to occupy approximately 14.8 miles of stream within the Sunrise Project area. Those same streams are listed as Designated Critical Habitat (DCH) for Bull trout. Based on the distance from project activities and occupied habitat, and the implementation of project design criteria and BMP monitoring, there would be no measurable direct, indirect or cumulative effects from the implementation of the Sunrise Vegetation and Fuels Management Project under the proposed action Alternative.

For the reasons stated above, the implementation of the Sunrise Project under the proposed action Alternative May Affect, Not Likely to Adversely Affect Bull trout and/or their Designated Critical Habitat.

**Western ridged mussel**

*Gonidea angulate* is not known to occur within or adjacent to the Sunrise project boundary. Due to the lack of presence and through the implementation of project design criteria and BMP monitoring, there would be no direct, indirect or cumulative effects from the implementation of the Sunrise Vegetation and Fuels Management Project under the proposed action Alternative.

For reasons stated above, the implementation of the Sunrise Project under the proposed action Alternative would have no impact to Western Ridged Mussel individuals or their habitat.

**Shortface lanx**

Shortface Lanx, aka Giant Columbia River Limpet, are not known to occur within or adjacent to the Sunrise Vegetation and Fuels Management Project area. Due to the species not being present in the project area and through implementation of project design criteria and BMP monitoring, there would be no direct, indirect or cumulative effects from the implementation of the Sunrise Project under the proposed action Alternative.

For reasons stated above, the implementation of the Sunrise Project under the proposed action Alternative would have no impact to Shortface Lanx individuals or their habitat.

For additional information on either action Alternative, please see the Fisheries Specialists Report.
Cumulative Effects

*Alternative A (No Action)*

Cumulative impacts result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Since there is no action under Alternative A, there are no direct or indirect effects and therefore no cumulative effects.

Species composition and structural changes at the landscape scale described in the Vegetation Report would not occur by mechanical means, therefore succession would remain on its current trajectory further away from landscape range of variation.

Stream temperatures would be unaffected under the No Action alternative.

Under the No Action alternative, the current road densities, road use designations and use patterns within the analysis area would not change. Motor vehicle and recreational off road vehicle use would continue to occur on routes designated on the Umatilla National Forest motor vehicle use map (MVUM). Erosion and sedimentation from roads would continue as roads are used and maintained according to their respective maintenance level. Continued deferred maintenance of the majority of system roads would be the primary management related sources of accelerated erosion. Natural disturbance events such as fires and floods could affect stream temperature and sediment regimes over time, if these events cause large-scale changes to vegetation or stream channel morphology.

The hydrologic function of streams in the project area would continue to recover within the limitations of past and present management (timber harvest and roads) and periodic high flow events.

Large scale fire could affect water yield and peak flows, with resultant adverse effects to channel and riparian condition, with resultant loss of fish habitat.

*Alternative B*

**Stream Temperature**

Past management activities, including road construction/maintenance, timber harvest and fuels treatments affected the overstory structure and thus the shade component of the streams. This ultimately affected stream temperature. This alternative proposes to use prescribed fire to treat fuels. Fire ignition would occur within 600 feet of fish bearing streams in the NF Asotin Creek subwatershed and within 300 feet of fish bearing streams in the Lick Creek subwatershed. These activities are not expected to remove shade producing trees along the streams and therefore would not be expected to affect stream temperature.

There would be no cumulative effects to stream shade or water temperature as a consequence of implementing this alternative.

**Sedimentation**

Past actions including grazing, fires, fire exclusion, harvest, road construction, road obliteration and recreation have occurred in the project area. Plant species composition and ground cover have changed and invasive plant species are present.

Effects to water quality are directly linked to water yield. If erosion from a road or upslope treatment does not enter into a waterbody, there would be no effect to water quality. Sediment
transport occurs primarily during spring runoff. For more information on sedimentation, see the Hydrology and Soils Reports.

Temporary roads would be decommissioned after use. Decommissioning would reduce sediment potential and help restore infiltration capacity. Decommissioning may include blocking, ripping/scarifying, seeding, and possible mulching with emphasis to improve hydrologic soil function. BMP monitoring of decommissioned temporary roads would be performed to help ensure resultant erosion is reduced to background levels.

No cumulative sediment effects are expected because design criteria and BMPs shape the actions proposed in this project such that no measurable sediment is expected to reach surface waters. See also the Soils Report.

**Large Woody Debris**

Historic logging in the riparian areas likely affected large wood recruitment in watershed streams. Dispersed recreation may have impacted and could still impact in-stream large wood and potential recruitment. Recreational impacts would come in the form of firewood cutters and campers utilizing wood from within the riparian areas.

The felling of hazard trees within the RHCAs would increase the amount of wood at the reach scale but may not be measureable at the watershed scale.

No cumulative large woody debris effects are expected because design criteria and BMPs shape the actions proposed in this project such that no measurable impacts are expected.

**Pools/mile**

Historic logging and recreational impacts likely affected pools/mile over time by reducing the amount of large wood available for recruitment. This has led to a reduction in stream channel roughness, bed scour and in-channel deposition.

This alternative is not expected to have any direct or indirect effects on pools and therefore would have no cumulative effects.

**Width/Depth ratio**

Historic logging and recreational impacts likely affected width/depth ratio over time by reducing the amount of large wood available for recruitment. This has led to a reduction in stream channel roughness and in-channel deposition.

This alternative is not expected to have any direct or indirect effects on channel morphology and therefore would have no cumulative effects.

**Alternative C**

Cumulative effects under this alternative would be the same as those described in Alternative B.

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretreivable commitment of resources with implementation of proposed activities.
3.10 Hydrology

This section incorporates by reference the Sunrise Hydrology Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

Introduction

As the action alternatives consist of commercial timber harvest, commercial and non-commercial thinning, prescribed burns – and each will utilize system and temporary roads, the effects to hydrological functions is of utmost importance to the project analysis.

Regulatory Framework

Land and Resource Management Plan

The Umatilla National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines as shown in Appendix C. Implementation of design criteria and best management practices as described above, Umatilla National Forest Road Use Rules, as well as standard Umatilla NF timber sale contract specifications or the corresponding stewardship contract specifications would constitute compliance with the Umatilla National Forest Land and Resource Management Plan for hydrologic and water quality components.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

Clean Water Act of 1972

The Clean Water Act of 1972 and amendments require the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters. All of the activities proposed in this project were designed to be consistent with the Clean Water Act and State of Washington Water Quality Standards.

Floodplains, Executive Order 11988

E.O. 11988 requires the Forest Service to avoid “to the extent possible the long and short term adverse impacts associated with the ... occupation ... or modification of floodplains...” The E.O. also provides direction to restore and preserve the natural and beneficial values served by floodplains. Actions proposed in the Sunrise Project would preserve the beneficial values of floodplains within the project area and for this reason, the Sunrise Project is consistent with this EO.

Wetlands, Executive Order 11990

E.O. 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." The Sunrise Project does not propose to destroy or modify any wetland. For this reason, the Sunrise Project is consistent with this EO.

Municipal Watersheds

There are no designated municipal watersheds in the Sunrise Project area.
Methodology
Analysis indicators used to summarize past, present, and future conditions include road density, location and road-stream crossings. These parameters represent the potential for increased drainage efficiency (rate of runoff) from roads compared to the unroaded condition. Roads that intersect or parallel streams may extend channel networks, contribute polluted runoff directly to streams, and alter shade and temperature conditions.

Continuous recording thermographs have been deployed in several streams in and downstream of the project area. The WEPP Model (Flanagan and Livingston 1995) is a physically-based soil erosion model that can provide estimates of soil erosion and sediment yield by considering the specific soil, climate, ground cover, topographic condition, and management activity. The Disturbed WEPP module was used by the Forest soil scientist to model hillslope erosion due to vegetation treatments and burning (see Soils Report). The WEPP Road module was used to compare road-derived sediment among alternatives (Elliot et al 1999b).

A method commonly used to evaluate harvest effects on water yield and peak flow is the Equivalent Clearcut Acre (ECA) analysis (King 1989). A procedure was developed for the Umatilla National Forest as part of Endangered Species Act consultation (Ager and Clifton 2005). ECAs were calculated following the Umatilla National Forest protocol to determine existing levels of harvest and estimate potential water yield and peak flow effects in the analysis area. Percent ECA measures the extent of created openings and is used as an indirect measure of the hydrological effects (increases in water yield and peak flow) of vegetation alteration. The procedure to determine percent ECA includes harvest method and vegetative recovery rates developed for the Blue Mountains. Roads are included in the calculation of ECA as part of this analysis.

The ECA model accounts for changes in the forest canopy caused by past timber harvest, fires, insect infestations, and road construction. Effects of actions and events are pro-rated over time to model their recovery on the ground. The ECA model assumes that disturbances which remove certain percentages of basal area recover hydrologically over certain periods of time, depending on the plant associations. Model results should be considered relative values only (not absolute predictions) for purposes of comparing background and activity effects. Actual conditions and activities are more complex than those used to make model estimates. The ECA model assumes that project implementation would occur in the same year, and be completed by the end of 2018. This assumption affects the timing of the response indicator of the ECA. In actual practice, the activities would be likely take approximately 5 to 10 years to fully implement. However, the assumptions and simplifications provide a reasonable analysis and estimation of project effects for purposes of comparing relative differences with and without activities and between alternatives.

Affected Environment
The hydrologic system and the hydrologic effects of proposed actions will be analyzed for National Forest System (NFS) lands by the 12 digit Hydrologic Unit Code (HUC), also known as a subwatershed (SWS). HUC is a national level interagency map of the hydrologic system. Table 3-44 shows examples of HUC codes. Cumulative effect indicators including Equivalent Clearcut Area (ECA) are reported by HUC 12. Effects to water quality are based on the stream reaches identified by Washington Department of Ecology (WDOE). WDOE designates beneficial uses of water resources and establishes water quality standards protective of those uses.
The Sunrise analysis area contains about 32,000 acres of National Forest Service (NFS) lands located in portions of eight subwatersheds and Table 3-44 shows the two main subwatersheds of the analysis area.

Table 3-44. Subwatersheds within the Sunrise project area.

<table>
<thead>
<tr>
<th>Subwatershed (HUC12)</th>
<th>SWS Name</th>
<th>SWS acres</th>
<th>NFS acres in SWS</th>
<th>Project Acres in SWS</th>
<th>% Project Area in SWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>170601030201</td>
<td>North Fork Asotin Creek</td>
<td>28,163</td>
<td>25,007</td>
<td>24,822</td>
<td>88%</td>
</tr>
<tr>
<td>170601030202</td>
<td>Lick Creek</td>
<td>12,342</td>
<td>8,231</td>
<td>6,567</td>
<td>53%</td>
</tr>
<tr>
<td>170601030203</td>
<td>South Fork Asotin Creek</td>
<td>25,794</td>
<td>11,961</td>
<td>222</td>
<td>0.9%</td>
</tr>
<tr>
<td>170601030204</td>
<td>Charley Creek</td>
<td>14,403</td>
<td>9,277</td>
<td>218</td>
<td>1.5%</td>
</tr>
<tr>
<td>170601060310</td>
<td>First Creek</td>
<td>13,576</td>
<td>13,576</td>
<td>18</td>
<td>0.1%</td>
</tr>
<tr>
<td>170601060704</td>
<td>Menatchee Creek</td>
<td>21,079</td>
<td>16,563</td>
<td>36</td>
<td>0.2%</td>
</tr>
<tr>
<td>170601070501</td>
<td>Headwaters Pataha Creek</td>
<td>18,320</td>
<td>8,906</td>
<td>19</td>
<td>0.1%</td>
</tr>
<tr>
<td>170601070601</td>
<td>Headwaters Tucannon River</td>
<td>24,508</td>
<td>24,508</td>
<td>96</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Figure 3-11. Subwatersheds within the Sunrise project area.
Resource Indicators and Measures
Treatment alternatives will be evaluated based on their effect to hydrologic function and condition, water quality, and water yield. Indicators used to analyze effects of proposed actions are as follows:

**Hydrologic Function, Floodplains and Wetlands:**
- road density (mi/mi²)
- roads in RHCAs (mi)
- road-stream crossings (number)

**Water Quality:**
- water temperature
- sediment

**Water Yield:**
- Equivalent Clearcut Area (ECA < 20%)
- road density (mi/mi²)

Existing Condition and Regulatory Framework
Elevations in the Sunrise planning area range from about 2,400 feet where North Fork Asotin leaves NSF lands to about 6,000 feet along ridge tops near Forest Road 40. The increase in elevation from this uplift caused streams to cut down and form very steep, and generally narrow, V-shaped canyons. The area is drained by the North Fork Asotin Creek and Lick Creek, which generally flow from the Southwest to Northeast. Numerous springs and seeps occur, predominantly in headwater areas. Annual precipitation ranges from about 20 inches per year at lower elevations to 40 inches per year at the highest elevations. Most of the annual precipitation falls between November and May and much of the winter’s precipitation occurs as snow.

**Hydrologic Function and Condition**
The mapped stream system in the Sunrise Project area includes 49 miles of perennial streams, 62 miles of intermittent streams and 3 miles of streams with a discontinuous flow regime. These streams represent the channeled system. The analysis area also contains numerous unchanneled ephemeral draws, with 121 miles mapped in GIS.

**Floodplain Function (Executive Order 11988)**
Executive Order 11988 is applicable to those Federal actions which will occur in or which will impact upon flood prone areas, which includes portions of Lick Creek. The order requires agencies to take action to reduce the risk of flood loss and minimize the impact of floods, as well as preserve the values served by floodplains. Each agency has a responsibility to evaluate the potential effects of any actions it may take in a floodplain. Most of these effects occurred downstream of the Forest boundary where the stream flows through deeper sediments and where the stream is confined in the valley bottom along FR40. A floodplain is present and developing, but is narrower and less complex than historically, due to channel incision and lack of large wood.

**Wetlands (Executive Order 11990) and Groundwater Dependent Ecosystems (GDE)**
Executive Order 11990 requires agencies to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of
wetlands. The US Fish and Wildlife Service National Wetlands Inventory identifies 345 acres of riverine wetlands in the two project watersheds.

**Table 3-45. Sunrise Riverine Wetlands Summary of Total Acres (Acres of National Forest Lands within Project Area)**

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>Total Subwatershed Acres (Acres Within Project Area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lick Creek</td>
<td>108 (82 within project area)</td>
</tr>
<tr>
<td>NF Asotin Creek</td>
<td>263 (263)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>371 (345)</strong></td>
</tr>
</tbody>
</table>

**Water Quality**

The Clean Water Act (CWA) as statute requires both State and Federal agencies to develop standards for water quality. The State of Washington and the Forest Service developed a Memorandum of Agreement (MOA) defining each entities responsibilities for compliance with the CWA. The MOA designates the Forest Service as the management agency responsible for meeting the Clean Water Act on NFS lands and recognizes best management practices (BMPs) as the primary mechanism to control nonpoint source pollution on NFS lands.

Water quality standards are based on life stages of fish and the most restrictive need sets the standard. Water temperature and sediment are the main water quality parameters related to the proposed action (Table 3-46).

**Table 3-46. Water Quality Standards for Temperature and Sediment**

<table>
<thead>
<tr>
<th>Water Body</th>
<th>Aquatic Life Uses</th>
<th>Temperature</th>
<th>Turbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lick Creek and tributaries</td>
<td>Core Summer Habitat</td>
<td>16°C (60.8°F)</td>
<td>Not to exceed 5 NTU over background OR &lt; 10% increase when background &gt; 50 NTU</td>
</tr>
<tr>
<td>North Fork Asotin Creek and tributaries</td>
<td>Char Spawning and Rearing</td>
<td>12°C (53.6°F)</td>
<td></td>
</tr>
</tbody>
</table>

**Water Temperature**

The MOA designates the Forest Service as the management agency responsible for meeting the Clean Water Act on NFS lands and recognizes best management practices (BMPs) as the primary mechanism to control nonpoint source pollution on NFS lands.

Lick Creek has exceeded the temperature standard 3 of 18 years and nearly all data collected from the North Fork Asotin Creek on the Umatilla National Forest have exceeded the bull trout standard.

**Sediment**

Sediment mobilized from hillslopes and roads may be stored in channels for years or delivered into a stream within a season depending on precipitation patterns. Suspended sediment yield measured in the High Ridge Evaluation Area of the Umatilla Barometer Watershed (located about 40 miles southwest of the Sunrise Project) had a 12-year (1984-95) average annual yield of 19 tons/mi² (range 3 – 43) for the control (unlogged) catchment, with high inter-annual variability (Helvey and Fowler 1995). Sediment transport during spring snowmelt was the dominant transport process, although rain-on-snow events produced some of the largest single event volumes.

The Lick Creek Demonstration project monitored hillslope erosion effects from prescribed burning, mechanical harvest and mechanical fuels treatments from 2002-2005 (Wondzell and
Sunrise Vegetation and Fuels Project

Clifton 2005; Zamora and Martin 2006). Background hillslope erosion was very low (< 2 tons/mi²) which suggested a low amount of sediment was delivered to valley floors and into streams. The Lick Creek Demonstration Project only collected four years of data, so other long-term studies, such as the High Ridge study, may provide more accurate background levels for analysis.

Rocks

The road system within the Lick Creek and North Fork Asotin Creek subwatersheds contain about 124 miles of open, closed and decommissioned routes (Table 3-47). Routes on FS lands include 4.6 miles of maintenance level (ML) 4 roads, 17.3 miles of ML 3 roads, 37.8 miles of ML 2 roads and 38.9 miles of ML 1 (closed) roads. Crushed aggregate has been applied to about 55 miles of road surface. The North-South ATV trail has about 5.5 miles in the project area and occurs on about 4 miles of non-system routes and about a mile of open and closed roads. WEPP modelling of all roads within the Sunrise project area estimates that erosion from road surfaces entering into stream channels is currently 1.5 tons of sediment per year from 58 crossings (Hydrology resource specialist report).

The road system within the North Fork Asotin subwatershed occurs predominantly in upland areas and only enters into RHCAs at road-stream crossings. About 64% of the road crossings are on native surface roads and most of these (39 of 47) occur on Class IV or V (unchanneled) streams. The sediment transport rate from road surfaces at stream crossings using the WEPP model (Elliot et al 1999a) calculated that the current road system is adding < 1 ton per year of sediment in the North Fork Asotin Creek and Lick Creek subwatersheds.

Road density is used as an indicator of potential for affects to hydrologic function (extension of the stream network) and water quality (sediment delivery to surface waters). Stream crossings are used as an indicator of the degree of connectivity between the road system and the drainage network.

Table 3-47. Road Density and Stream Crossings on NFS Lands at the Subwatershed Scale

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>NFS (mi²)</th>
<th>System Roads (mi, open and closed)</th>
<th>Road Density (mi/mi²)</th>
<th>Decommissioned Roads (mi)</th>
<th>Stream Crossings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lick Creek</td>
<td>12.8</td>
<td>23.8</td>
<td>1.9</td>
<td>31.7</td>
<td>35</td>
</tr>
<tr>
<td>NF Asotin Creek</td>
<td>39.1</td>
<td>62.4*</td>
<td>1.6</td>
<td>5.8</td>
<td>23</td>
</tr>
</tbody>
</table>

Both SWS have few miles of road in RHCA. Most of the stream-road intersections are ephemeral or intermittent crossings. Field reconnaissance from 2014-2016 found that > 80% of the formally decommissioned roads are effectively closed to motorized use.

Within the project area, the higher RHCA road densities (Table 3-48) are the result of geomorphic constraints, with most roads located on ridgetops, rather than steep hillslopes and deep canyon bottoms. Roads selected for decommissioning were mostly located on steep hillslopes or near valley bottoms where the risk for erosion and sedimentation were the highest.

Table 3-48. RHCA Road Interactions within the project area

<table>
<thead>
<tr>
<th>SWS Name</th>
<th>RHCA (mi²)</th>
<th>Open Road Miles w/in RHCA</th>
<th>RHCA Road Density (mi/mi²)</th>
<th>Road Miles Decommissioned</th>
<th>Stream-Road Intersections (open roads)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lick Creek</td>
<td>0.9</td>
<td>4.6</td>
<td>5.1</td>
<td>4.4</td>
<td>26</td>
</tr>
</tbody>
</table>
Grazing

In the Sunrise Project area, the Peola Allotment has 37 stock ponds and 5 spring developments in Lick Creek and 4 stock ponds and 3 spring developments in North Fork Asotin subwatersheds. There are 5 stock ponds and 2 spring developments in the North Fork Asotin Creek subwatershed in the Asotin Allotment. The ungrazed portion of the Sunrise Analysis area has 3 old stock ponds and 3 spring developments in the North Fork Asotin Creek subwatershed. Livestock are trailed along roads in the RHCAs of Lick Creek, Dry Fork Lick Creek and Sheep Gulch in the Peola Allotment. Lick Creek is fenced near the mouth of Dry Fork Lick Creek to prevent livestock effects to the streambank and near bank vegetation.

Water Yield

McCammon (1993) assigned risk to watersheds from changes in cover and evapotranspiration as low (< 15%), moderate (15 – 30%) and high (> 30%). Reviews of literature demonstrate that the relationship is highly variable (Stednick 1995 and Scherer 2001). Generally effects are not seen below 20% ECA and in a local study effects were not seen below 50% ECA (Helvey and Folwer 1995). Grant et al (2008) reported that increased peakflows could occur at >20% ECA and that the potential for effects to channel morphology is in the 5-10 year recurrence interval flow ranges.

Subwatersheds in the planning area are below the 15% threshold of concern established by NMFS and the 20% threshold for hydrologic effects. Based on model assumptions, management induced changes in water yield, timing of flow, or peak flow are currently negligible.

Prescribed Burning

Troendle et al (2010) summarized the hydrological effects of prescribed fire, which are largely a function of fire severity and area burned. Fires are typically set during times when flame lengths are expected to be low, fire residence times short and soil heating expected to be low. Because the low severity of prescribed fires do not cause a high degree of mortality or litter combustion, the effects to overstory canopy, evapotranspiration and forest floor water storage are generally too small to measurably change shade or watershed-scale water yields.

Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)

The ecological processes described would continue on the current trajectory unless a large-scale disturbance such as a high severity fire or high intensity rainfall or rain-on-snow event occurs within the project area.

Hydrologic Function

No change to the existing road system would occur under this alternative. Road density, proximity to channels and number and location of stream crossings would remain the same. Few
of the analysis area roads have regular maintenance. FR44 (Smoothing Iron Road) was improved in 2014 for log haul from South George timber sale units and FR41 (Lick Creek Road) was resurfaced in 2017. Unauthorized ATV use on some closed, decommissioned and non-system roads would continue to inhibit vegetation re-establishment, reduce infiltration rates and increase the potential for runoff.

**Floodplains**

There would be no direct or indirect effects to floodplain function because this alternative would not change water yield, peak flows or sediment regime, thus current levels of channel stability and morphology would not be altered.

**Wetlands and GDEs**

Alternative A does not propose new ground disturbing activities in stream- or spring-associated wetlands; therefore, there would be no direct or indirect effects to wetlands or GDEs as a result of this alternative.

**Water Quality**

**Water Temperature**

Alternative A would continue with passive RHCA management, which is to allow the current rate of succession without intentionally altering species density or composition. Water temperature would improve slowly over time as near channel vegetation grows and provides more shade. The magnitude of this change is unknown and related to the degree that shade currently departs from site potential. Temperature standards in Lick Creek may be exceeded in years with warmer summers and low snowpack winters. Water temperature in North Fork Asotin Creek would continue to exceed state standard for bull trout, as evidenced by past monitoring.

Disturbance events such as fires and floods could reverse this trend in vegetation. The time frame for shade and water temperature improvement is long, related to the growth rate of site potential vegetation, which in the case of overstory canopy would take decades to regrow.

**Sediment**

Modelling by the soil scientist indicates that current rates of sedimentation from hillslopes are low (0.03 tons/acre or < 19 tons/mi²). Road-related modelling by the hydrologist indicates that the road system is contributing sediment at rates considerably lower than background estimates (< 2 tons total) and this would continue to be an ongoing sediment source. Natural disturbance regimes such as fires and floods would be the dominant sediment risks for the future, as indicated by sediment modelling based on expected fire behavior (see Fuels Report). Research has shown that elevated sedimentation could be expected for up to five years post-fire.

MacDonald and Sosa-Perez (2017) found that 15 months after burning 100% of the road segments in areas burned at high and moderate severity were connected to streams, even though the mean stream distance was > 200 feet away from a stream, whereas, pre-fire only about 15% of roads were hydrologically connected to streams.

**Water Yield**

No change to the existing road system would occur under this alternative. Road density and number and location of stream crossings would remain the same. Therefore, drainage patterns would remain unchanged and there would be no effect to water yield. Alternatives B and C
**Floodplains**

There would be no direct effects from timber harvest activities on floodplain function because no new roads would be constructed in floodplains and landings and skidding would not occur in floodplains.

Previously approved prescribed fire projects would proceed under the No Action alternative. Prescribed fire ignition for landscape prescribed fire or activity fuel treatments would not occur inside RHCAs but fire would be allowed to back into RHCAs. The high level of moisture would lessen fire severity in these areas.

There would be no indirect effects to floodplain function because this alternative would not change water yield, peak flows or sediment regime, thus current levels of channel stability and morphology would not be altered.

**Wetlands**

Alternatives do not propose new ground disturbing activities in stream- or spring-associated wetlands during harvest and thinning operations and these areas would be protected by PACFISH RHCA buffers. Implementation of prescribed fire operations would include no ignition zones within 100 feet of springs and other perennial wetlands < 1 acre in size and 150 feet for wetlands > 1 acre. Subsequent erosion and sedimentation are expected to be minor. There would be no indirect effects to wetlands or groundwater dependent ecosystems as a result of this alternative because these areas would burn with none to low soil burn severity and vegetative recovery would occur rapidly and hydrologic function would not be altered.

**Water Quality**

Current policies, regulations, BMPs, and adaptive management techniques are expected to minimize unwanted sedimentation from forestry related activities.

**Water Temperature**

With peak stream temperatures occurring in July and August, summer stream temperature increases due to removal of riparian vegetation are well documented and have led to development of best management practices to protect shade.

Proposed harvest/thinning and associated activity fuels treatments would not occur inside of interim PACFISH RHCAs, therefore the canopy density in RHCAs and shading would be maintained along all perennial streams. Because shade would not be changed, water temperature changes due to increased solar loading would not occur from this project.

**Landscape Prescribed Fire**

Proposed landscape burning is included in action alternatives totaling approximately 14,060 acres (11,000 acres forested and 3,000 acres grassland). Several of the project design criteria are prescribed to limit the intensity of the fire (see Fuels Report). Fire intensities would be kept low via the prescription. Short head fire runs may occur, as well as individual tree and group torching in areas where there are sufficient ladder fuels, and in timber stands with high occurrences of mistletoe infected trees.

The 14,060 acres proposed for prescribed burning are divided into four landscape prescribed fire areas. These four areas would be divided further into burn blocks and may take multiple prescribed fire entries over multiple years to complete.
No created openings are expected to occur in RHCAs of perennial and fish-bearing streams. Shade and therefore effects to water temperature from landscape burning at near natural rates would be protected.

_Danger Tree Removal_

Danger trees would be felled along all haul routes used in the proposed timber sales. They would be left on the ground inside RHCAs and commercially removed elsewhere. Most stream crossings on haul routes are ephemeral or intermittent with no or very low summer flows. Danger trees felled on haul routes within RHCAs of perennial streams would have negligible effect on shade density for affected streams.

_Sediment_

Silvicultural ground disturbing activities which may result in runoff include harvesting operations, road maintenance, construction and use, mechanical site preparation and prescribed fire. Potential downstream effects are increased where these activities impinge on unchanneled swales or low order stream channels.

Effects to sedimentation are expected to be limited when best management practices (BMPs) and other design criteria are implemented.

_Non-Commercial Hand Thinning_

Noncommercial hand thinning is planned for 1,677 and there would be no ground disturbance and therefore no erosion or sediment from this activity.

_Harvest and Treatments_

Design criteria for each action would include no-harvest within interim PACFISH RHCAs. These design criteria would prevent damage that could contribute to erosion and sedimentation into channels and streams (Belt et al, 1992). Minimal detrimental soil acres would occur in RHCAs and haul road effects would be mitigated when design criteria are implemented and landings would occur outside of the RHCAs. Refer to the Soils Report for discussion of logging and mastication systems effects to ground cover and soil stability.

Heavy equipment trails have the potential to impact ephemeral streams by introducing fine sediment. The trails may also capture the ephemeral flows, and begin to function as Class IV streams. Ephemeral streams are protected from these impacts by design criteria. Sites would be chosen to avoid, minimize or mitigate potential for erosion and sediment delivery to nearby.

_Landscape and Prescribed Fuels Reduction Burning_

This treatment would reintroduce fire to a fire-dependent ecosystem, lessening the effects of a future uncharacteristic wildfire and improve forage quality for big game. Fire intensities would be kept low, by establishing backing fires to minimize fire in the canopy, and burning mainly surface fuels throughout the majority of the project area. Individual tree and group torching would likely occur in areas where there are sufficient ladder fuels, and in timber stands with high occurrences of mistletoe infected trees.

The Pomeroy Ranger District has been conducting prescribed burns for decades. Fuels management activities would be designed and executed to maintain or enhance fish and wildlife habitat within the Forest Plan Standards and Guidelines of 10% mineral soils and 80% stream surface shading (Forest Plan, C5, pg 4-166). This will be accomplished by incorporating design
criteria identified in Chapter 2. All burning operations are conducted in accordance with a
detailed Burn Plan. Proposed prescribed burning in the North Fork Asotin Creek and Lick Creek
subwatersheds alone would not increase ECA above threshold values and therefore, would not
cause detectable changes in water yield, peak flows or base flows.

**Haul Roads**

Maintenance, reconstruction and construction would be performed using standard specifications
to accomplish surface blading, hazard tree removal, construction of drainage dips or water bars,
dust abatement with water, surface rock placement, roadside brushing, ditch cleanout, culvert
maintenance or removal and replacement, road surface shaping and draining, surface material
processing and erosion control. BMPs, design criteria and applicable road maintenance
specifications are contained in EM-7730-20.

Temporary roads are constructed on stable soils and are intended for project use only. To
minimize impacts to soil and water resources, pre-existing temporary road alignments and
alignments of previously decommissioned system roads would be used. New temporary roads
are proposed to access landings where existing system roads or existing alignments are not
adequate. After use, newly constructed temporary roads would be obliterated by reestablishing
former drainage patterns or natural contours, installing waterbars (if needed), removing gravel
surfacing, decompacting road surfaces, pulling back unstable fill slopes or shoulders, scattering
slash on the roadbed, applying erosion control much, seeding disturbed areas and blocking or
disguising the former road entrance to prevent motorized vehicle traffic.

**Danger Tree Removal**

This activity would occur along haul routes. Danger trees felled inside RHCAs would be left on
the ground and no ground disturbance would occur. Removal of danger trees outside of RHCAs
could lead to ground disturbance as equipment traveled off road or trees were winched to the
road. Slope distances would be short and erosion and sedimentation would be unlikely.

**Direct and Indirect Effects**

**Alternative B**

The direct effects of implementing the Alternative B would be the removal of 26.5 MBF of
timber from 5,520 acres (including development of skid trails, landings and 13.7 miles of
temporary road) and pre-commercial thinning (hand and mastication) an additional 2,270 acres.
Treatment of activity fuels would include mastication, lop and scatter, hand piling, grapple
piling, pile burning, jackpot burning and/or broadcast burning. Prescribed fire is proposed for
14,055 acres of forest and grassland.

**Hydrologic Function**

The existing road system would not change in Alternative B (no new roads are proposed and the
project would not decommission any National Forest System roads) and temporary road
construction would be located and managed such that there would be no effect to the drainage
network. Road maintenance would occur on up to 90 miles of system roads used by timber sales
and would include blading, ditch relief culvert cleanout, spot rock and ditch cleanout as needed
(see Transportation Report). Culvert cleanout and necessary ditch cleanout would lead to
immediate reductions in risk from the road system. Detrimental effects from ditch cleanout
would be short term, less than one year. Closed roads would be left in a self-maintaining
condition.
Access to units 120 and 190 via FR4027016 would require 3 culverts to be installed in Class IV streams and access to units 71 and 216 via FR4000224 would require 1 culvert to be installed on a Class IV stream. The original culverts were removed when the roads were closed. The culverts would be appropriately sized per standard engineering design. Per BMPs, road reconstruction and culvert installation would occur under dry conditions and no disturbance would occur outside of the existing footprint. Culverts would be removed and embankments stabilized by seeding and mulching after completion of silvicultural treatments.

Alternative B would require the construction of 13.7 miles of temporary roads to access vegetation treatment units in the North Fork Asotin Creek subwatershed and road density would temporarily increase from 1.6 to 1.9 mi/mi² until these roads are decommissioned. No temporary roads would occur in RHCAs and using McCammon (1993) as a guide, road densities < 3 mi/mi² would constitute a low risk to detrimental effects to hydrologic function. No effect to watershed function would occur.

Road density in the Lick Creek subwatershed would not change because no temporary roads are proposed under Alternative B, and there would be no direct or indirect effects to hydrologic function in Lick Creek subwatershed.

**Floodplains**

Alternative B requires the installation of four culverts. Culverts would be re-installed in previous locations, then removed after completion of silvicultural treatments, hence there would be no new disturbance to floodplains.

**Water Temperature**

Alternative B would not adversely affect water temperature because harvest, thinning and burning would not measurably remove the shade component along any stream channel. Because there would be no change to shade, there would be no adverse effect to beneficial uses and no effect on the 303(d) listing status of streams. In addition, no adverse changes to channel condition from silvicultural treatments are predicted because water yield and peak flow would not be affected, therefore, morphological channel changes which could affect stream temperature would not occur.

**Sediment**

**Harvest and Fuels Treatments**

Harvest, thinning and prescribed burning would produce lower short and long term sedimentation rates than a higher severity wildfire based on WEPP model runs and assumed background levels (see Soils Report). In addition, the longer term benefit of treatments would be to reduce the severity of future wildfires commensurate with changes to desired fire regime condition classes (see Fuels Report), which would result in lower erosion and sedimentation rates. This effect is expected to last for decades because of the reduced fuel loading from proposed treatments.

Based on the Lick Creek study, effective ground cover would remain within Forest Plan standards during and after treatments and ground cover is expected to recover to pre-activity levels within 2 years. Therefore, any potential increase in hillslope erosion and sedimentation would return to background levels within this time frame. There would be a low risk of sediment entering into stream channels when design criteria are implemented.
Roads

Approximately 13.7 miles of temporary road construction is proposed in Alternative B in the North Fork Asotin Creek Subwatershed. 5.8 miles or temporary road would occur on previously disturbed areas (old roads or skid trails). Associated with 5 road segments are 6 areas where these roads would cross unchanneled swales. BMPs such as rock armor or corduroy log mats would be placed at draw bottom crossings to maintain the integrity of the ground surface during use.

Water Yield

All temporary roads would occur in upland areas, above the point on the landscape in which snowmelt or rainfall runoff enters into a defined channel. Stream density would remain in the low risk category and there would be no new road crossings that would extend the stream network farther into upland areas. There would be no changes to the road system in the Lick Creek subwatershed. As a result, there would be no measureable increase in streamflow at the subwatershed scale. Therefore there would be no direct or indirect effect to water yield or peak flows from these actions under this alternative.

Alternative C

The direct effects of implementing Alternative C would be the removal of 12.1 MBF of timber from 2,550 acres (including development of skid trails, landings and 8.4 miles of temporary road) and precommercially thinning an additional 2,270 acres. Treatment of activity fuels would include mastication, lop and scatter, hand piling, grapple piling, pile burning, jackpot burning and/or broadcast burning. Prescribed fire is proposed for 14,055 acres.

Hydrologic Function

The existing road system would not change in Alternative C (no new roads are proposed and the project would not decommission any National Forest System roads) and temporary road construction would be located and managed such that there would be no effect to the drainage network.

Alternative C would require the construction of 8.4 miles of temporary roads to access vegetation treatment units in the North Fork Asotin Creek subwatershed and road density would temporarily increase from 1.6 to 1.8 mi/mi² until these roads are decommissioned. No temporary roads would occur in RHCAs and using McCammon (1993) as a guide, road densities < 3 mi/mi² would constitute a low risk to detrimental effects to hydrologic function. The road locations would be upslope of where channel formation has occurred in draw bottoms. Temporary roads would occur across 2 unchanneled ephemeral draws and design criteria would include rock or other armoring to prevent rutting and maintain ground cover. Cut and fill construction would be needed for about 2 miles of temporary roads. Decompaction, pulling of sidecast berms, recontouring where needed, revegetation and camouflaging of entranceways would be used to completely decommission these roads at the end of harvest. No effect to watershed function would occur.

Road density in the Lick Creek subwatershed would not change because no temporary roads are proposed under Alternative C, and there would be no direct or indirect effects to hydrologic function in Lick Creek subwatershed.
**Water Temperature**

Alternative C would not adversely affect water temperature because harvest, thinning and burning would not measurably remove the shade component along any stream channel. Because there would be no change to shade, there would be no adverse effect to beneficial uses and no effect on the 303(d) listing status of streams. In addition, no adverse changes to channel condition from silvicultural treatments are predicted because water yield and peak flow would not be.

**Sediment**

*Harvest and Fuels Treatments*

Effects in the Lick Creek subwatershed would be the same as Alternative B. Alternative C would treat approximately 2,970 acres less than Alternative B in the North Fork Asotin Creek subwatershed. Although the overall rate (tons/acre) of change in fire regime condition class and erosion/sedimentation are similar to Alternative B, the amount of sediment (tons) would be less because fewer acres are treated (see Soils Report). Initially, the potential sediment load from thinning and mastication areas would be less than alternative B. However, the net long-term benefit of wildfire risk reduction would not be as much as alternative B because 1,700 fewer acres with moderate to high fire behavior would be treated under Alternative C.

**Roads**

Approximately 8.4 miles of temporary road construction is proposed in Alternative C in the North Fork Asotin Creek Subwatershed. 3.6 miles or temporary road would occur on previously disturbed areas (old roads or skid trails). Associated with 2 road segments are 2 areas where these roads would cross unchanneled swales. BMPs such as rock armor or corduroy log mats would be placed at draw bottom crossings to maintain the integrity of the ground surface during use.

*Fuels Treatments and Landscape Prescribed Fire*

The longer term benefit of treatments would be to reduce the severity of future wildfires commensurate with changes to desired condition classes, which would result in lower erosion and sedimentation rates. However, the net long-term benefit of wildfire risk reduction would not be as much as Alternative B.

**Water Yield**

Alternative C would add 8.4 miles of temporary road in the North Fork Asotin Creek subwatershed and temporarily increase road density from 1.6 to 1.8 mi/mi². Temporary roads would not occur in RHCAs. All temporary roads would occur in upland areas, above the point on the landscape in which snowmelt or rainfall runoff enters into a defined channel. Stream density would remain in the low risk category and there would be no new road crossings that would extend the stream network farther into upland areas. There would be no changes to the road system in the Lick Creek subwatershed. As a result, there would be no measurable increase in streamflow at the subwatershed scale. Therefore there would be no direct or indirect effect to water yield or peak flows from these actions under this alternative.
Cumulative Effects Common to All Alternatives

**Water Quality**

Motor vehicle and recreational off road vehicle use would continue to occur on routes designated on the Umatilla National Forest motor vehicle use map (MVUM). Erosion and sedimentation from roads would continue. Continued deferred maintenance of the majority of system roads would be the primary management related sources of accelerated erosion.

The current level of livestock use would continue and would be managed under the allotment management plans and annual operating instructions which allows flexibility to meet resource objectives. Weeds treatment would continue to occur along roads and in areas identified on the 2017 Planned Treatments Map (USFS 2017) and implementation would follow design features described in the Umatilla National Forest Weeds EIS (USFS 2010). Natural disturbance events such as fires and floods could affect stream temperature and sediment regimes over time, if these events cause large-scale changes to vegetation or stream channel morphology.

The Asotin Prescribed Burn would occur on about 7,943 acres within the Sunrise Project area. Under the modeled wildfire scenario, there would be an additional 0.09 tons/acre from the Lick Creek subwatershed and 0.11 tons/acre from the North Fork Asotin subwatershed (see Soils Report).

**Cumulative Effects**

**Alternative A**

Species composition and structural changes at the landscape scale described in the Silviculture Report would not occur by mechanical means, therefore succession would remain on its current trajectory further away from landscape scale range of variation.

**Water Quality**

Stream temperatures would be unaffected under the No Action alternative.

Road densities and road use designations would remain unchanged with the No Action alternative. Erosion and sedimentation from roads would continue as roads are used and maintained according to their respective maintenance level.

Current levels of hillslope erosion are low and erosion from hillslopes is expected to be localized. Alternative A would not reduce the severity of wildfire, as described in the Fuels Report, and the effects wildfire are higher soil burn severity, loss of effective ground cover, increased soil exposure increasing the potential for hillslope erosion and potential failures.

**Floodplain Condition**

The hydrologic function of streams in the project area would continue to recover from past harvest within the limitations of past and present management (timber harvest and roads) and periodic high flow events. Large scale fire could affect water yield and peak flows, with resultant adverse effects to channel and riparian condition, with resultant loss of fish habitat.

**Wetlands and Groundwater Dependent Ecosystems**

The hydrologic function of stream-associated wetlands in the project area would continue to recover within the limitations of past and present management (timber harvest and roads) and
periodic high flow events. The condition of seeps and springs in the project area would continue to be influenced by current livestock management, as summarized in the Range Report.

Water Yield

Current ECA values for Lick Creek and North Fork Asotin Creek subwatersheds are low compared to threshold value of 20% and suggest that there is no measurable difference between current conditions and those with no harvest. Vegetative recovery through time would continue to reduce ECA values. Current values of ECA when added to the Asotin Prescribed Fire Project (Table 3-49) indicates that there would continue to be no measurable increase in water yield or peakflows.

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>Current ETA</th>
<th>Asotin Rx</th>
<th>Total ECA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lick Creek</td>
<td>3.2%</td>
<td>4.2%</td>
<td>7.4%</td>
</tr>
<tr>
<td>NF Asotin Creek</td>
<td>1.5%</td>
<td>3.4%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

Cumulative Effects Common to All Action Alternatives

Water Quality

Temperature

Past actions, including road construction and timber harvest, affected overstory structure and, by default, shade which resulted in a higher exposure of surface water to solar radiation. In the alternatives, prescribed fire ignition would not occur within 600 feet of each side of fish-bearing streams in North Fork Asotin Creek subwatershed, 300 feet of each side of fish bearing streams in Lick Creek subwatershed, within 150 feet each side of perennial non-fish bearing streams, or within 100 feet of springs and other isolated wetlands. All alternatives would temporarily open roads for log haul in RHCAs with perennial streams. These activities would not remove any overstory shade-producing trees, although understory hardwoods, such as alder would be cut. As described in Direct and Indirect Effects, shade would not be affected and there would be no affect to water temperature at the reach scale from the proposed project and so no mechanism for cumulative effects to water temperature.

Road construction and previous timber sale activities on Forest Service lands removed shade-producing vegetation along portions of perennial streams. The last timber sales within what are now RHCAs occurred nearly 25 years ago. Occasional hazard trees are felled along roads within RHCAs and this activity has a negligible effect to shade. An exclosure fence was constructed on lower Lick Creek about 15 years ago to limit livestock access. Approximately 38 miles of roads have been decommissioned in the two subwatersheds during the past 20 years. Most of these roads are effectively closed to motor vehicles and are in the process of hydrologic and vegetative recovery. The combined effect of these activities has had a positive effect to shade-producing vegetation in RHCAs.

Sediment

Past actions including grazing, fires, fire suppression, timber harvest, road construction, road obliteration and recreation have occurred in the project area. Plant species composition has changed and invasive plant species are present. Ground cover has been affected and the sediment regime has likely changed some unquantified amount through time, including ongoing actions. Sediment transport would continue to occur primarily during spring runoff. Effects to water
quality are directly linked to water yield because, if erosion from a road or hillslope treatment
does not enter into a waterbody, there would be no effect to water quality.

Erosion resulting from prescribed burning is generally less than that resulting from roads, skid
trails, and site preparation techniques that cause soil disturbance (Robichaud et al 2010).
Robichaud et al (2010) also reported that sediment effects from fuel management activities
generally return to pre-disturbance levels within 1 to 2 years. The Fuels Report describes
predicted modification of fire behavior as a result of changes to fire regime condition class from
vegetation management and fuels reduction projects in the Sunrise Project area. These actions,
together with the Asotin Creek Prescribed Burn Project would provide long term beneficial
effects to water quality because lower fire severity and intensity from future wildfires are
expected to result in lower soil burn severity at the landscape scale (see Soils Report).

Sediments are a major nonpoint-source pollution problem in forests, most often associated with
forest roads (MacDonald and Stednick 2003). Direct and indirect effects to soil and watershed
resources under proposed action would include short-term (hours to days) effects such as erosion
and sediment delivery resulting from removal of ground cover during construction of temporary
roads and landings.

Approximately 38 miles of roads have been decommissioned in the two subwatersheds during
the past 20 years. Most of these roads are effectively closed to motor vehicles and are in the
process of hydrologic and vegetative recovery. FR41 along Lick Creek was resurfaced with
crushed aggregate in 2017 which has improved the running surface and stabilized the eroding
subgrade material. An exclosure fence was constructed on lower Lick Creek about 15 years ago
to limit livestock access to streambanks. The combined effect of these activities has had a
positive effect to reducing hillslope and road-related sedimentation to streams.

Temporary roads would be decommissioned as soon as feasible after use to reduce sediment
potential and help restore infiltration capacity. Decommissioning would include a combination of
the following to improve hydrologic soil function: recontouring, ripping/scarifying, seeding,
mulching and blocking the entrance. The Forest Service policy for control of nonpoint sources of
pollution is to use BMPs, monitor the implementation and effectiveness of those BMPs, and
adjust management practices using monitoring results.

All action alternatives would increase livestock distribution on the allotment by increasing
access and/or increasing available forage for livestock. Management of livestock would improve
with all action alternatives due to increased visibility and access for livestock herding and due to
the short term increase in forage. An increase in distribution of livestock on the uplands could
decrease the amount of use on riparian areas. Field reconnaissance in 2014 and 2016 indicates
that there would continue to be a low risk of sediment transported downstream into Class I, II
and III waters from livestock grazing.

**Floodplain Condition**

Channel stability is the ability of a stream, over time, in the present climate, to transport the
sediment and flows produced by its watershed in such a manner that the stream maintains its
dimension, pattern and profile without either aggrading or degrading (Rosgen 1996). Natural
processes of floods and high severity wildland fire would occur, over time and the surrounding
forest would continue to grow and trees would die and some would fall into streams. The result
of these phenomena would result in changes to the stream shape and sediment dynamics.
The Sunrise Project would not change the flow regime (water yield or peak flows) or sediment regime, therefore there would be no cumulative effect to channel morphology from proposed silvicultural activities. Cumulative effects to floodplains would be not occur because temporary changes to road densities and stream crossings at the subwatershed scale of analysis are negligible and implementation of design criteria would not increase detrimental soil conditions above threshold amounts.

**Wetlands and GDEs**

Ground disturbing activities would not occur in stream- or spring-associated wetlands as a result of the alternatives. Spring, seep and other wetland areas not previously identified and which are identified during unit layout would also be protected with no-skid buffers. Prescribed fire that burn near or across seeps, springs and other wetland areas would not permanently alter hydrologic properties associated with those features. Water developments for livestock are the main sources of hydrologic alteration to springs in the project area and there would be no additional adverse effects to these resources as a result of the Sunrise Project.

**Alternative B**

**Water Yield**

Effects of past harvest and road building, proposed harvest, and landscape burning on water yield and peak flows were analyzed with ECA Model as described in the *Existing Condition* section of this report and the *Hydrology Report*. Based on the assumptions of the ECA model and the literature cited and assuming that vegetation and fuels treatments would occur over a several year time frame, the proposed harvest and landscape burning would not have a measurable effect to hydrologic functions (capture, storage, and release of water) in the North Fork Asotin Creek and Lick Creek subwatersheds when combined with the Asotin Prescribed Burn Project and other past vegetation treatments.

Figure 3-12 shows how ECA would change over a ten year time frame under this scenario, with ECA remaining below the 20% threshold value for cumulative effects to water yield.

**Figure 3-12: Seven Year Implementation Schedule ECA**

**Alternative C**

**Water Yield**

The same timber sale and prescribed fire scenario described for Alternative B were input into the ETA model for Alternative C, which indicates that when treatments are implemented over the
course of several years, rather than instantaneously, the ECA would remain below the 20% threshold value for cumulative effects to water yield for Lick Creek and NF Asotin Creek (see Figure 3-9).

![Figure 3-13: Alternative C – Seven Year Implementation Schedule ECA](image)

**Project Design Criteria and Mitigation Measures**

Implementation of actions proposed under the Sunrise project would include BMPs and project design criteria applicable to all action alternatives and these are listed in Appendix C and additional BMPs are identified in the Soils Report.

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

### 3.11 Soils

This section incorporates by reference the Soils Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Introduction**

Soil is the vital link that connects so much to so many in a healthy forest ecosystem, and as such was chosen as a resource due additional analysis.

**Regulatory Framework**

**Land and Resource Management Plan**

The Umatilla National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines for all activities.
The Desired Future Condition in the 1990 Forest Plan (LRMP) for water/soil is to maintain soil productivity (Forest Plan p. 4-9). The plan further states that Standards and Guidelines are to maintain a minimum of 80 percent of an activity area in a condition of acceptable productivity potential. Acceptable productivity is defined as:

- Less than 20% increase in bulk density of volcanic soil or a less than 15 percent increase in soil bulk density for other forest soils.
- Soil disturbance of less than 50 percent of the topsoil humus enriched A1 and or AC horizons from an area 100 sq. ft. (i.e. 5ft by 20ft)
  - Molding of the soil in vehicle tracks that area rutted to a depth less than 6 inches.
- Severely burned soil with the top layer of mineral soil altered in color (usually to red) and the next ½ inch blackened from organic matter charring.
- Plan and conduct land management activities so that soil loss from surface erosion and mass wasting, caused by activities will not result in an unacceptable reduction in soil productivity or water quality.
- Management activities shall be designed and implemented to retain sufficient ground vegetation and organic matter to maintain long-term soil and site productivity.
- Active slump and landslide area are considered unavailable for road construction. Areas with known landslide potential and lake sediments require special transportation planning and design, layout preconstruction, construction and maintenance techniques.

Federal Law

Multi-Use Sustainable Yield Act (1960)

The project with described mitigation and BMPs in place should be able to meet the intent and direction of the Sustained Yield Act. Sustained yield means achieving and maintaining into perpetuity a high-level annual or regular periodic output of renewable resources without impairment of the productivity of the land.

Clean Water Act

Project design features were developed for the protection and maintenance of soil productivity during and after the implementation of the Sunrise Project. Minimizing the risk of sedimentation as a result of large scale, high severity wildfire within the project area through the use of these design features to maintain soil stability would allow the Sunrise Project to meet the intent of the Clean Water Act.

Compliance with LRMP and Other Relevant Laws, Regulations, Policies and Plans

For the proposed actions within this proposed project there would be 7 activity units under alternative B and 5 activity units under alternative C expected to exceed DSC defined by the forest plan if project design features such as re-using existing skid trails and subsoiling are not implemented (see Soils report). Project design features were developed to allow needed vegetation management to occur in the Sunrise Project area while providing for restoration of soil productivity.

The project with described mitigation and BMPs in place should be able to meet the intent and direction of the LRMP as it pertains to the soil resource.
It is assumed that the project being able to meet LRMP and FSM will lead to a project that will be considered sustainable in the terms of the Sustained Yield Act.

**Methodology**

**Remote Data – Soil Productivity (Erosion and Sediment) and Stability**

First a query was done of the Terrestrial Ecosystem Unit Inventory soil survey data to determine the soil types present within the planning area. These soils have been previously mapped under contract with the Blue Mountain TEUI. This mapping is inspected by the Forest Service and NRCS as contract task orders are completed and the resulting survey is commensurate with NRCS county soil surveys. Some of the taxonomic information (texture, slope range, surface rock content) was used in the erosion analysis, along with estimated vegetation data. The erosion analysis was conducted to determine if the proposed activities would create a risk to either soil productivity (erosion) or water quality (sediment). Lastly the TEUI mapping was used to eliminate unstable locations. No units were altered by this stability analysis.

The Water Erosion Prediction Project (WEPP, Elliott and Robichaud, 2001) has developed several modules that are used to estimate hillslope erosion and sedimentation:

https://forest.moscowfsl.wsu.edu/fswepp/. WEPP simulates seasonal hydrology, surface hydrology and hydraulics, subsurface hydrology, vegetation growth and residue decomposition and sediment detachment and transport from a hillslope using five major input variables: climate, slope, soil texture, rock content and management scenario.

To evaluate erosion risk following a management action or wildfire, the model was run using a stochastic climate for 50 years of possible weather. The long term data were used to account for temporal variability of storm patterns occurring in different years. Average monthly precipitation data from the Spruce Springs SNOTEL site (located at the northwest corner of the project area) were manually entered into the climate model and adjusted slightly to represent an average precipitation distribution in the upper North Fork Asotin Creek watershed, where most of the treatments would occur. A separate climate scenario was modelled for the lower elevation Lick Creek treatment units.

The following activities were modelled: undisturbed forest, timber harvest with tractor logging, timber harvest with skyline logging, mastication fuels treatment, prescribed fire as a landscape burn, prescribed fire of activity fuels. Each activity affects ground cover and soil properties. In addition, low to high severity wildfire was modelled to estimate background hillslope sediment and evaluate effectiveness of proposed treatments at reducing sedimentation as a result of a wildfire burning under current fuel conditions (See Fuels Report for Modeling Summary).

WEPP modeling included the range of slopes, soil textures and surface rock content characteristics identified in the TEU descriptions. This range of characteristics typify hillslopes that occur within or are contained by proposed treatment areas. WEPP uses two slope elements in the model. The upper slope element represents the disturbance activity (e.g. mechanical harvesting, mastication, burning), and a lower slope element which represents the sediment buffer to a waterway. The Soil report summarizes WEPP input variables and estimates of sedimentation (hillslope soil loss) due to ground-based yarding, skid trails, skyline yarding, and burn severity due to prescribed burning and wildland fire.

Model results are summarized by the two major subwatersheds of the project area: Lick Creek and North Fork Asotin Creek. Approximately 249 treatment acres occur in 6 other subwatersheds (SWS): 89 acres in the Charley Creek SWS, 5 acres in the First Creek SWS, 2 acres in the
Headwaters Pataha Creek SWS, 50 acres in the headwaters Tucannon River SWS, 17 acres in the Menatchee Creek SWS and 86 acres in the South Fork Asotin Creek SWS. WEPP results for the North Fork Asotin Creek subwatershed would also be applicable to these treatment areas using the estimated erosion and sedimentation rate in tons/acre.

Soil Productivity Influenced by Detrimental Soil Conditions (DSC)

Forest Plan standards and guidelines for management induced soil disturbance are described in terms of the amount of area of an activity unit (for example, a harvest unit) exceeding certain levels of effects to soil in degree and extent. Effects that are considered include compaction, displacement, rutting (puddling), and severe burning from prescribed fire. Changes from natural conditions from any permitted or management directed activity (e.g. livestock grazing) is included in assessments. Effects from compaction, displacement and puddling, in particular, tend to be persistent and last many years in this area. A study in central Idaho indicates that natural recovery of the soil may take 40 to 70 years (Froehlich and McNabb 1983).

The persistence of compacted soil over time, for example, determines its effect on stand response and the long-term effect on forest productivity. How long soils remain compacted is determined by natural recovery rates or tillage operations or both (Froehlich and McNabb 1983). As such, these effects from previous soil disturbing actions are often still observable. Not all soil disturbance is detrimental - exceedance of certain threshold values triggers characterization of that disturbance as detrimental. For example, compaction is considered detrimental if bulk density is increased more than 20% for ash soils.

Units were assessed for the extent and degree of previously impacted soil using aerial photo analysis, GIS mapping of prior harvest activities and field observation starting in the fall of 2014. Units with prior harvest history and the likelihood for greater existing effects were evaluated by the Forest Soil Scientist for quantitative assessment relative to Forest Plan standards and guidelines for detrimental soil condition. An estimate of DSC as a percentage of the areas was assigned for each activity unit to provide a consistent tracking measure.

Potential effects to soil productivity would be created by the equipment used and methods employed to implement this project. Skid trails are pathways used to transport trees, logs, and other forest products from the forest to a deck, landing or roadside. Skid trails are usually for temporary use and may be used only once or equipment may make many passes. If they are not planned, constructed or used correctly or rehabbed when needed, skid trails can have long-lasting effects on soil productivity and water quality. Landings are locations where trees, logs or other forest products are removed and temporarily placed so they can be loaded onto trucks for transport. Because of the disturbance to exposed soil and repeated equipment traffic in a concentrated area, soils become compacted and have the potential to produce significant runoff and erosion.

Remote Data – Soil Productivity Influenced by Detrimental Soil Conditions

Qualitative estimates are considered sufficient to meet assessment, analysis, and monitoring objectives (FSM 2551.4). To provide an understanding of soil productivity within proposed units, and how past activities may have influenced the soil resource; remote observations were made to identify legacy impacts. These observations began as remote sensing of historic aerial photos and contemporary aerial photographs. Areas with assumed presence of legacy equipment disturbance or a noticeable change to current vegetative cover; were digitally mapped.
The presence (or absence), growth and development of trees in legacy roads and skid trails was considered to be a surrogate for soil productivity. Observations included a presence or absence of tracks (ruts), berms and/or apparent blading of the ground surface. The presence of ruts or berms is a sign of soil disturbing equipment traffic (soil molding). Although trails are expected to recover to natural soil conditions over time, it was assumed these changes in vegetation and soil structure are a signature of reduced soil productivity (i.e. DSC) within the prism of these mapped features.

Signs of equipment traffic visible through the forest canopy using aerial photos available from the Forest Service database and Google Earth were used to digitize features. Historic aerial photos available on Google Earth were examined to identify and digitize locations of skid trails and landings, if they were not visible on more recent photography.

Estimates of DSC for previous harvest units that were not observable from aerial images are based on sampling for the Kahler Project (Archuleta 2013) which found that detrimental conditions corresponded to about 3% of an activity unit.

**Field Observations – Soil Productivity (Erosion and Sedimentation), Stability and Detrimental Soil Conditions**

Observations of soil conditions occurred during field reconnaissance in 2014 and 2016. Observations were made during field reconnaissance for soil stability and field examinations for these features do not conflict with completed soil mapping (TEUI). No signs of instability were observed and presence of erosion tended to be associated with localized occurrences. No areas identified as a chronic source of natural erosion that may be a source of sediment. There were some locations where overland flow could offer sediment, but due to the gentle slopes and minor scour of the exposed soil; it is assumed that this occurrence was likely within background erosion and sediment volumes.

Some units had roads that were decommissioned by: blocking the entrance and allowing natural regeneration; scarifying and seeding; subsoiling and seeding; and/or recontouring. Roads that were subsoiled and recontoured are considered to have removed compaction and restored infiltration and percolation properties. Other methods have not effectively removed the traveled surface and are still considered to have legacy impacts and these roads are included in the calculation for DSC. New temporary access roads are not counted as DSC because they would be rehabilitated to break up compaction and seeded and mulched to restore ground cover.

**Affected Environment**

**Scale of Analysis**

This analysis is spatially bound by the proposed vegetation treatment unit boundaries, temporary access routes to those units and landscape prescribed fire boundaries. The analysis is temporally bound by the timing of activities at the unit and landscape scale, which will inform when mitigation measures would be implemented to maintain or restore soil productivity.

The Umatilla NF Land and Resource Management Plan (LRMP) has soil productivity goals that are used as indicators of change, which will be grouped into four resource elements for this analysis. For this analysis, the observed change to vegetation (absence, conversion to grass/forb, reduced growth) due to compaction, puddling, displacement or severely burned soil as evidenced by the presence of non-system roads, presumed skid trails and landings is used as a surrogate for the four components of detrimental soil conditions (DSC).
Indicators for comparison purposes between alternatives are:

- **Soil Mass Wasting** – soil stability
- **Erosion** – soil productivity
- **Sediment** – water quality
- **Change or Absence in Vegetation Growth** – detrimental soil conditions (as a result of old roads, landings, skid trails)

**Existing Condition**

*Natural Development*

Soils in the analysis area have been mapped with the Terrestrial Ecological Unit Inventory (TEUI). These taxonomic delineations result in polygons of various shapes and sizes across the landscape. Polygons are populated with either a soil consociation (single series) or soil complexes of various soil series. Some soil series have either been previously identified in another soil survey or newly identified within the TEUI mapping on the Umatilla NF. Soil complexes can have two to four soil series within a complex, the first series named in the complex is the dominant, with the remaining series placed in its place of dominance in the complex name.

In the taxonomic description for each of the soil series, there is a soil order. Soil order information offers clues to the history of a given landscape and a better picture of the landscape environmental development. Within the project, three soil orders are identified by the soils mapped in proposed units. The soil orders within the project area range from slight (Andisols) to intermediate (Mollisols) in their degree of development (Brady and Weil 1999).

*Soil Complexes*

The project area contains 21 individual soil series, which comprise the 38 soil complexes. A complex is composed of two or more soils series and/or a miscellaneous area (such as rock outcrop), plus allowable inclusions. Each complex has a dominant soil, which is the first series of the complex name (see Soils Resource Report).

*Human Influences to the Soil Resource*

As mentioned in Methodology, human influences have caused some change to the soil resource. Some of these influences have been recognized as having either beneficial, no effect, or detrimental effects to the soil resource.

Previous NEPA decisions have determined that the current road system is needed to implement the multiple uses that occur on National Forest System lands within the Pomeroy Ranger District. The Sunrise Project contains about 140 miles of developed National Forest System roads, which has removed about 240 acres from vegetative production. Some of these roads occur within or adjacent to proposed treatment units. Following manual direction (FSM 2551.3, 2010), soil management standards and guidelines are generally not applied to administrative sites or dedicated use areas (such as roads, recreation sites). This report analyzes the effects of non-NFS roads, skid trails, landings and user created routes that occur within proposed treatments units, in addition to modelled hillslope erosion and sedimentation from proposed activities.

The most direct and recognizable influence left on the Sunrise landscape is from past harvest activities. Several studies reported that compaction and displacement effects associated with
temporary roads and skid trail equipment traffic can detrimentally influence vegetation and their associated soil communities (Froehlich and McNabb 1983, Amaranthus et al, 1996, Bulmer and Simpson, 2010 and Miller et al, 2004). Often, effects from temporary roads, landings and skid trails do not prevent vegetation from growing seedlings, but these features can limit the opportunity of vegetation to reach maturity or result in loss of ecologic function and economic value. Additionally if left on the landscape without Effective Ground Cover (EGC) these features can cause erosion (Lane et al 1988). Depending upon the proximity of effects to surface water, they could serve as sediment sources. At this time there are no observed hillslope sources of direct sediment input within the project area. Forest Plan standards for EGC after cessation of any soil-disturbing activity is shown Table 3-50.

<table>
<thead>
<tr>
<th>Erosion Hazard Class</th>
<th>Minimum EGC 1st Year</th>
<th>Minimum EGC 2nd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (very slight, slight)</td>
<td>20-30%</td>
<td>30-40%</td>
</tr>
<tr>
<td>Medium (moderate)</td>
<td>30-45%</td>
<td>40-60%</td>
</tr>
<tr>
<td>High (severe)</td>
<td>45-60%</td>
<td>60-75%</td>
</tr>
<tr>
<td>Very High (very severe)</td>
<td>60-75%</td>
<td>75-90%</td>
</tr>
</tbody>
</table>

In the past, human ignited fire could be partially responsible for stand densities consistent with Mollisol soil development. In a general sense, it is assumed that maintenance burning would beneficially consume fuels, preventing the high intensity/long duration fire that can detrimentally heat alter the soil resource. Conversely, current human suppression of fire helps to build wildland fuel loads that may create detrimental effects to the soil resource (i.e. heat altered soil). Heat altered soil is commonly associated with sterilization of the topsoil and the formation of hydrophobic layers that promote erosion and stream sediment.

**Erosion and Sediment**

Erosion and sedimentation from undisturbed forest floor conditions are low and often not measureable (Elliot and Miller, 2017). Baseline surface erosion and the sediment it may create were modeled with WEPP, for slopes and soil textures found within proposed harvest units. To generate baseline hillslope erosion and potential sedimentation (amount of sediment transported from a hillslope to a stream), the range of variables in units were populated in the model to test the greatest distance offered within the model (1200 ft.). This modeling showed a baseline that was low probability (0%) of sediment and low volumes of sediment (undetectable).

A recent hillslope erosion study (Wondzell and Clifton 2005) within the Sunrise Project area measured very low background erosion rates ranging from 0.0001 – 0.003 tons/acre. The study also monitored erosion from fuels and harvest treatment and these data were used to improve WEPP model calibration at low erosion rates. Use of local data greatly improves the confidence of the model results to display differences between treatments and alternatives. Results of the Lick Creek study showed very little runoff due to the lack of large rainfall events. The study was only conducted for 4 years, and therefore only captured a small sampling of weather conditions. Harris et al. (2007) concluded that without major storm events to drive extensive overland flow, the physical mechanism that would drive erosion and downslope sediment transport was lacking.

A 12 year data set collected at the Umatilla Barometer Watershed High Ridge study site (Helvey and Fowler 1995) reported background sedimentation rate of 0.03 t/ac (19 t/mi²), which is still a
very low amount of erosion. Because of the larger dataset and longer period of record, the High Ridge data will be used to define baseline estimates for the Sunrise Project. Model results should be considered estimates only, and used as relative values for purposes of comparing fire effects and management scenarios. Because of natural variability in climate, soil types, cover, and other factors, and assumptions made to simplify modeling, results are at best plus or minus 50 percent (Elliot et al, 1999).

**Resource Indicators and Measures**

Table 3-51 summarizes the existing condition for the resource elements and indicators. Assessment of potential hillslope erosion and sedimentation were modeled using WEPP, as described under ‘Methodology’ and results of WEPP modelling are in Appendix D of the specialist’s report available at the Pomeroy Ranger District. The Hydrology Report analyzes the effects of road-related sediment, therefore the Soils Report will only address potential sediment derived from proposed hillslope treatments.

<table>
<thead>
<tr>
<th>Resource Element</th>
<th>Resource Indicator</th>
<th>Measure</th>
<th>Existing Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Soil Stability</td>
<td>Soil Mass Wasting</td>
<td>Active areas identified (acres)</td>
<td>0</td>
</tr>
<tr>
<td>2) Soil Productivity</td>
<td>Erosion</td>
<td>tons (tons/acre)</td>
<td>&lt; 0.03</td>
</tr>
<tr>
<td>3) Water quality</td>
<td>Sediment</td>
<td>tons (tons/acre)</td>
<td>&lt; 0.03</td>
</tr>
<tr>
<td>4) Detrimental Soil Conditions (DSC)</td>
<td>Change or absence in vegetation growth</td>
<td>Legacy roads, trails, landings in project area (acres)*</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legacy roads and trails and landings in proposed treatment units (miles/acre)</td>
<td>57/121</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Legacy landings in proposed treatment units (acres)</td>
<td>21</td>
</tr>
</tbody>
</table>

*Complete inventory is not available, assumed DSC at 3% of landscape previously harvested is based on intensive monitoring for other project areas on the Umatilla National Forest; these are acres outside of proposed treatment units

**Resource Indicator or Measure 1**

Aerial photo analysis for soil stability and observations made during field reconnaissance for these features do not conflict with completed soil mapping (TEUI) or add to known landslide features mapped on the Umatilla NF. Therefore this resource indicator of slope stability is not a factor in this analysis.

**Resource Indicators and Measures 2 and 3**

The most productive part of the soil is often the closest to the mineral surface (Brady and Weil 1999). Erosion would either change the location of productive soil or be a loss of soil productivity to stream channels as sediment inputs. Additionally, it is assume that the network of legacy trails can offer means to route surface flow and sediment to streams.

Field observations of forested areas appeared to be consistent with the low overall expected sedimentation rates measured during the Wondzell and Clifton (2005). Presence of widespread, management-induced active hillslope erosion and gullying were not observed during field reconnaissance. Small-scale gully-erosional features associated with sparsely vegetated non-forested openings were observed in several areas within the project area, such as near the Mount
Misery Snowmobile Shelter. These type of non-forested areas would be avoided and therefore not be affected by proposed management actions.

The WEPP model summarizes hillslope erosion and sedimentation in the same table, therefore these two indicators will be evaluated together for each subwatershed. The assumed background hillslope erosion and sedimentation rate is 0.03 tons/acre. Current condition modelled results for forested hillslopes of the Lick Creek and North Fork Asotin subwatersheds mirrored those reported by Wondzell and Clifton (2005), which showed essentially no measureable erosion or sedimentation. Grassland areas of the Lick Creek SWS also showed no erosion or sedimentation under conditions modeled. At the landscape scale, grassland areas of the NF Asotin subwatershed averaged 0.07 tons/acre or about 143 tons of sediment from 2,042 acres.

Sedimentation observed or measured in natural stream channels can originate from hillslope erosion or from stream channel bed and bank erosion. The lower 4-5 miles of Lick Creek within the project boundary were deeply scoured during runoff events in the winter of 1996-97. This was most likely due to accelerated streamflow through the narrowly confined valley bottom, unconsolidated fill material and low amount of bank stabilizing riparian vegetation along non-perennial portions of the stream channel. Field reconnaissance in 2014 found that streambank stability along lower portions of Lick Creek are still below stability thresholds described by Rosgen (1996) for similar stream types. Reconnaissance along Cougar Canyon, Middle Branch of the North Fork and North Fork Asotin Creek in 2014 indicate that stream channel morphologies are stable for these stream types. Refer to the hydrology and fisheries reports for more detail on stream condition.

Resource Indicator and Measure 4

Without human intervention there are not many cases when the soil resource can be influenced. Thus the inhibition of the growth of trees and brush (FSM 2551.5, Figure 2 of the Soils Report) would be considered an expression of a detrimental change to the productivity of the soil resource. The presence of DSC was found in association with legacy roads, trails and landings. It is assumed that most of these trails were left from previous harvest activities, but some may have been created from unregulated recreation and firewood cutters in the area. Topography of the area is conducive to access for most forms of vehicles used in recreation activities. Estimates of DSC are based on GIS mapping of old roads, skid trails and landings, with some field verification of the presence of these features. For previously harvested units where linear features are not evident on aerial photos, an estimate of 3% DSC is assumed based on intensive DSC mapping for the Kahler project (Archuleta 2013).

Appendix E of the specialist report summarizes DSC by treatment unit. Overall, calculated DSC occurs on 141 acres within proposed treatment areas and currently exceeds Forest Plan Standards for Units 215 (30% or 1.9 acres) and 216 (24% or 1.5 aces). These trails appear to have inhibited vegetation growth and type of growth. Where site conditions allow, these areas would continue to recover toward a more natural state.

Environmental Consequences

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

All ground disturbing activities included in the list of past, present and reasonably foreseeable activities for the Sunrise project are relevant to cumulative effects analysis for DSC.
Direct and Indirect Effects

Alternative A (No Action)

Resource Indicator and Measure 1
Soil mass movement was not identified in the area, therefore, the No Action alternative would not increase or decrease the potential slope instability.

Resource Indicators and Measures 2 and 3
If the project area were to continue unchanged by further disturbance from humans or natural events it would remain on its current soil developmental trajectory with no direct change to the resource indicators of erosion or sedimentation. Direct and Indirect effects to erosion and sedimentation are expected to be small, with no elevation above assumed background levels.

Resource Indicator and Measure 4
This alternative would produce no increase or reduction in detrimental soil disturbance because logging operations and associated activities as proposed in other alternatives would not occur. No rehabilitation and native seeding of existing landings, skid trails, or unauthorized roads would occur to improve soil productivity on detrimentally altered sites.

Cumulative Effects

Resource Indicator and Measure 1
Cumulative effects are not expected from mass movement under normal weather conditions. NEPA is complete for the Asotin Prescribed Burn, which includes about 7,943 acres in the Sunrise project area. Table 7 of the specialist’s report shows how soil burn severity would change following a wildfire before and after the Asotin Prescribed Fire is implemented.

After the Asotin Prescribed Burn is implemented, this portion of the Sunrise Project area would have a reduced risk to post wildfire hillslope failures because an expected reduction in soil burn severity would maintain higher amounts of effective ground cover to protect mineral soils from wind and water erosion.

Resource Indicators and Measures 2 and 3
The Asotin Prescribed Burn would occur on about 7,943 acres within the Sunrise Project area. The same modeling scenario described under direct and indirect Effects was run for the Asotin Prescribed Burn. Under the modeled wildfire scenario, there would be an additional 0.09 tons/acre from the Lick Creek subwatershed and 0.11 tons/acre from the North Fork Asotin subwatershed (see Fuels Specialist report).

Erosion from hillslopes is expected to be localized unless influenced by a combination of high soil burn severity wildfire followed by high winds and runoff-producing rainfall events immediately after a fire. The potential duration of expected erosion risk would be for at least 3 years immediately following wildfire. The volumes of erosion under this risk are also influenced by the intensity and duration of precipitation events that occur during elevated erosion risk.

Current equivalent clearcut area (ECA) values for Lick Creek and NF Asotin Creek subwatersheds are low and well below threshold values (see Hydrology Report). Based on model assumptions, management induced changes in water yield, timing of flow, or peak flow are currently negligible, which indicates that streambed and bank derived sedimentation rates are not
being influenced by management activities at the subwatershed scale. The Asotin Creek Rx burn would increase the NF Asotin Creek ECA from 5.7% to 9.9% and Lick Creek would increase from 3.2% to 6.8%, which are below the threshold value of 20% that may result in changes to water yield and streamflow. Unless a large scale high severity fire burns within the Sunrise Project area and causes an increase in ECA above the threshold value due to the fire that results in streamflow increases, changes to the stream channel-derived sediment would not occur.

**Resource Indicator and Measure 4**

Detrimental Soil Conditions that are created by equipment traffic can be long-lived (>40 years). There are no cumulative effects to DSC for this alternative because there would be no additional land disturbing activities and areas of known DSC would not be rehabilitated to restore soil productivity.

*Common to All Action Alternatives (Alternative B and C)*

The Sunrise Project has two distinct treatment types at two different scales: 1) harvest, thinning and fuels treatment of activity units and 2) landscape prescribed burning. WEPP analyses are therefore based on different hillslope areas. Harvest, thinning and mastication units that also have broadcast burning as part of the fuels treatment were not counted in the landscape fire scenario, so that acres were not double counted.

**Resource Indicator and Measure 1**

Soil mass movement was not identified in the project area nor within individual treatment units. Aerial photo examination of proposed treatment units and other previously harvest areas in the project area indicates that past vegetation treatments did not cause obvious hillslope failures. Therefore, the direct and indirect effects of proposed treatments are presumed to also have no observable effect on mass movement.

**Resource Indicators and Measures 2 and 3**

*Harvest*

Soils in most of the units proposed for treatments have considerable volcanic ash content (ash soils) with susceptibility to compaction in both wet and dry condition, water erosion hazard, displacement and dry condition dusting (key concerns for these soil types). All soils in the area have at least some ash-influence in the surface layer.

Utility of the harvester-forwarder system for ground-based harvest (or other silvicultural treatments) mitigates to great extent the potential for these adverse effects when adequate ground cover is present or can be generated by operations. Nearly all of the smaller branches and needles are left on site, where, even if later jackpot or underburned, would allow nutrient retention in the unit. Virtually no landings are needed because the short logs can be decked along the length of adjacent haul roads. Erosion hazard is all but eliminated in typical operations of this type, with only occasional areas of bare soil limited to short sections (typically less than 25 foot in length) with a mosaic pattern that is not conducive to concentrating water sufficient to move soil.

Monitoring of other harvest activity on the Umatilla NF indicates cut-to-length processors and full-suspension forwarders result in detrimental soil impacts (per Forest Plan definition) dominantly in the 2 to 5% range (including fuels treatments in most cases, hence the slightly higher range than indicated above) with lesser compaction (in particular) on the shallower soil
types. The residual soils, and those with thin volcanic ash mantles (10 inches or less), have high
strength in dry conditions and do not compact easily. They are still susceptible to surface
displacement. The deeper soils, most with high ash content, are still susceptible to compaction
even when dry, as soil strength does not increase in ash soils to the same degree as in other
parent materials.

The results with the in-woods processors (including the cut-to-length systems using forwarders)
have been quite favorable in operations monitored on the Umatilla National Forest. The slash
mats spread compressive forces while little to no displacement occurs as there is minimal turning
forces or dragging of trees to move surface soil. Landings often overlap existing roads thereby
limiting additional effects to unaffected soil areas, or logs are simply piled roadside with no
scraping needed.

Feller-buncher plus skidding harvesting systems exposes more soil than does hand felling and
cable systems. Tractor operations which skids logs across the surface create greater area of bare
mineral soil subject to erosion. Skidding can also create “dusting-up” of volcanic ash soils if the
soil is very dry and there is little surface duff and branches to buffer the surface. Control of
operations during fluctuating moisture and freeze/thaw conditions (winter operations if utilized)
is crucial.

Tractor yarding of whole or partial-tree trees typically results in detrimental soil condition
percentages in the 4 to 8% range in these soil types and vegetation conditions. Areas with large
amounts of downed wood tend to have DSC in the lower end of the range as the downed wood
reduces the degree of compaction, rutting, and bare mineral soil created.

The previous discussion maintains the following assumptions: skid trails are perpendicular or
oblique slope angle to drainages; main skid trails with multiple passes experience considerably
more erosion than feeder trails with fewer passes; skyline corridors have higher ground cover
than skid trails; skyline corridors cause less ground disturbance but more dense than main skid
trails; proposed treatments would reduce the severity of wildfire which would result in lower
rates of sedimentation.

Understanding the benefiting opportunities from fuel loading (slash) with yarding method may
be an important factor to consider in the analysis. If harvest in a unit occurs before or as it
transitions from moist to dry soil conditions; equipment may need to ride on slash to minimize
DSC.

**Temporary Roads**

All action alternatives would construct temporary roads to facilitate commercial timber harvest.
The width of temporary roads and the number and size of turnouts would be limited to minimize
disturbance to soils, vegetation, and root mats. Construction of temporary roads would cause
direct effects in the form of compaction and displacement of soils. Erosion potential is the
greatest during and immediately after temporary road construction. A maximum of 13.7 miles of
temporary roads would be constructed to facilitate harvest on the various soils types.

Factors that influence surface erosion on temporary roads include erodibility of soils and
steepness of grade. All temporary roads are located on low to moderate gradient slopes outside of
RHCAs. Ash derived soils are the predominant soil type where temporary roads would be
constructed. Ash soils have high infiltration rates and high water holding capabilities that
decrease erodibility. Due to location, low erodibility of the soils, slope gradient, and the use of
Best Management Practices (BMPs), the potential for sediment reaching streams is low.
To reduce sediment potential the temporary roads would be decommissioned as soon as feasible after use. Decommissioning includes blocking, subsoiling, seeding, and possible mulching with emphasis to improve hydrologic, and soil function. Surface treatment (ripping or other tillage activity) would improve the infiltration, reduce or eliminate erosion hazard, and improve seed bed character upon completion, but remain in a reduced productive capacity if retained for future use. Soil structure should recover in the long term. Full obliteration would most fully return productive capacity over the long term. Monitoring of decommissioned temporary roads is important to assure erosion recovery is occurring and erosion is at a minimum. It is expected that decommissioning will prevent long term impacts.

### Prescribed Fire

Effects of concern from prescribed fire activity would be related to area of high soil burn severity (indicated by fire intensity) and total exposed soil surface subject to potential erosion hazard. The prescription for underburning and pattern of heavy fuel concentrations are prime determining factors affecting the extent of high severity burn areas. Contemporary prescriptions for underburning rarely create severe burn conditions. Total area of severely burned soils is expected to be very small, usually < 5% in broadcast treatment; increasing up to 10% of treatment areas if there are numerous concentrations of heavy fuels loadings resulting from either harvest activity or down woody levels. Exposed soil would be expected to be scattered in a mosaic pattern similar to heavy fuel loading patterns, rarely in continuous areas to become an erosion hazard.

### Mechanical Fuel Treatments

Use of mechanical fuel treatments adds additional equipment traffic while generally reducing the number of spots of severe burn intensity. Mastication (slash busting) equipment is proposed in some thinning or improvement cut harvest units to reduce created and existing slash, and protect the remaining stand which includes a considerable proportion of fire intolerant species. These are usually mounted on small-body excavator bodies with wide tracks. As such they have relatively low ground-pressure and can work on top of downed logs and existing or created slash. Additional compaction and some displacement can be created while turning. Operation on downed slash and other woody material and use of existing trails keeps additional compaction and displacement effects very low. Rolling drum type masticators can cause more ground disturbance because they are generally pulled behind a tracked machine than cause additional compaction, rutting and displacement of soils. Monitoring of grapple-piling operations on the Umatilla NF indicates detrimental soil impacts in the 0-2% range.

Specific impacts will depend on what equipment is used during different stages of treatment. Overall, short-term impacts may range from minimal to substantial negative impacts. Long term, the magnitude of impacts will decrease with time but some moderate negative impacts may persist in areas of high compaction.

### Cumulative Effects

Previous management activities over the past several decades compound to produce the existing condition. Activities include road building, timber harvest, site preparation, livestock grazing, fire suppression activities and prescribed fire. The concern, from a soils standpoint, is whether additional effects to the soil resources resulting from proposed activities would accumulate adverse effects to soil characteristics sufficient to affect productivity.
Existing soil disturbance is scattered across the project, concentrated on more level ground that is readily accessed. It is primarily in the form of old skid trails and access roads that were sufficiently disturbed at the time of their use. They remain in exceedance of criteria for detrimental disturbance levels. This existing detrimental soil condition is often referred to as legacy disturbance, and is factored into assessments of cumulative effects for new management actions.

A certain amount of overlap occurs when logging activity happens on units with existing detrimental soil condition as machinery reuses some trails and landing sites. This tends to reduce the amount of added, new detrimental soil impacts. However, this was not used to reduce the estimated increase percentage in DSC in the assessment due to uncertainty on the extent of this effect on a specific unit. This would likely lead to some overestimation of total potential DSC in units with existing soil disturbance from previous activity.

Cumulative effects relative to erosion hazard are not relevant within treatment units as surface recovery occurs rapidly enough to eliminate this as a cumulative concern. Data collected during a fuels treatment study (Wondzell and Clifton 2005) in the Sunrise Project area found that ground cover was maintained to Forest Plan Standards. Results of the Lick Creek study showed very little runoff, however, the study was only conducted for 4 years, and therefore only captured a small sampling of weather conditions. A 12 year data set collected as part of the Umatilla Barometer Watershed study (Helvey and Fowler 1995) reported background sedimentation rate of 0.03 t/ac (19 t/mi²).

Soil rehabilitation of adverse soil conditions is expected to be necessary on several units with existing high levels of DSC (see Appendix E of the Soils Report). Obliteration of temporary roads, scarification/subsoiling of landings, and retention of as much organic matter as fire risk/fuel objectives would help ameliorate and rehabilitate site conditions for productive capacity and reduced erosion hazard.

Direct and Indirect Effects

Alternative B

The direct effects of implementing the Alternative B would be the removal of 26.5 MBF of timber from 5,520 acres (including development of skid trails, landings and 51 temporary road segments totaling 13.7 miles) and precommercial thinning of an additional 2,270 acres. Treatment of activity fuels would include mastication, lop and scatter, hand piling, grapple piling, pile burning, jackpot burning and/or broadcast burning. Prescribed fire is proposed for 14,055 acres of forest and grassland. Appendix D of the specialist’s report summarizes the results of the WEPP batch runs for the Lick Creek and North Fork Asotin Creek subwatersheds.

Resource Indicator and Measure 1

See Effects Common to All Action Alternatives.

Resource Indicators and Measures 2 and 3

Actions under Alternative B that would have some effect on soil productivity (loss of soil through erosion) include ground disturbance from yarding operations (ground-based and skyline systems) and mastication, development of landings, development of temporary roads and prescribed burning. Each of these activities has an expected impact to the DSC (Reeves et al, 2011, Archuleta, 1997 and 1999, Siskiyou NF, 1997 and Bennett, 1982), which can influence erosion. During the implementation of activities, there would be some elevation of risk to
erosion and sedimentation. However BMPs and project design criteria would mitigate or diminish if not all, most of the short term effects from erosion.

Part of the purpose and need for this project is to implement actions that would facilitate restoration and maintenance of the desired fire regime condition classes across the landscape. WEPP was used to model effects of proposed treatments at two scales: 1) effect of thinning, harvesting and fuels treatment units at the hillslope scale, within each subwatershed and 2) effect of prescribed burning at the subwatershed scale, which used the fire condition and behavior modeling results.

The Disturbed WEPP program was used to model potential effects of the wildfire behavior simulation (see Fuels Report) as a basis to evaluate the effectiveness of proposed treatments at limiting the risk of hillslope soil loss. Elliott (2005) presents another method to compare fuels treatments at the landscape scale using the WEPP FuME Module.

The WEPP model calculates erosion and sedimentation estimates for storm events that have a high probability of occurrence in a given year (2.5 year return interval) to a low probability (50 year return interval), with increasing amounts of precipitation that generate higher runoff that results in potentially more hillslope erosion and sedimentation. The data show that the majority of the sediment is produced by lower frequency, higher precipitation events and ground cover becomes less of a factor at maintaining soil stability as the intensity and duration of precipitation increases. The model also assumes that BMPs for skidding and yarding would maintain ground cover at desired levels.

Based on the model runs and assumed background levels, harvest and prescribed burning would result in less potential hillslope erosion and sedimentation than a high severity wildfire burning under current fuel conditions. Beneficial effects of treatments are expected to last for decades because of the reduced fuel loading from proposed treatments.

**Treatment Units**

Based on the model runs and assumed background levels, harvest and prescribed burning would produce lower sedimentation rates than a higher severity wildfire. Average sedimentation rates from mechanical thinning and prescribed fire in the Lick Creek subwatershed are similar to that reported by Wondzell and Clifton and this amount would be negligible. Sedimentation rates from thinning, harvesting and fuels treatments in the North Fork Asotin Creek subwatershed would also be low during the first year post-treatment, although both are higher than the background rate. EGC would remain within Forest Plan standards and based on the Lick Creek Study, expected to recover to pre-activity levels within 2 years.

The longer term benefit of treatments would be to reduce the severity of future wildfires commensurate with changes to desired condition classes, which would result in lower erosion and sedimentation rates.

All treatment scenarios for the Lick Creek subwatershed indicate that on a weighted average basis, there is little difference between treatments (Table 3-52). The model runs for North Fork Asotin Creek (Table 3-53) indicate that at both scales, wildfire effects burning under current conditions would be mitigated by implementing density management treatments. Examining the difference between erosion/sedimentation rates at the landscape and unit scale indicates units proposed for treatment have the potential to produce twice as much sediment as the landscape as a whole and thus there is a longer term benefit to implementing these treatments.
WEPP was also used to validate the recommended water bar spacing for skid trails and temporary roads on steeper slopes, as shown in Appendix F of the soil resource specialist report; Project Design Features.

**Landscape Scale**

A complimentary analysis using the broader scale WEPP FuME model indicates that in the first year post treatment the benefits of implementing the proposed actions in both subwatersheds is similar to the overall average from the more detailed Disturbed WEPP. Appendix D of the specialist’s report contains the summary outputs of the WEPP model runs for the vegetation components of the Lick Creek and North Fork Asotin Creek subwatersheds.

The WEPP scenarios were run using a buffer of 100 feet, which is the minimum PACFISH buffer for Class IV (intermittent) streams. The project area contains Class I, II, III and IV streams with no thinning and no ignition buffers ranging from 100-300 feet. In addition, during the prescribed burn, project design criteria would implement a 600 ft. no ignition zone along Class I streams. For ground-based units, PDFs include water bar guidelines for skid trails. These practices would further limit potential for activity-generated sediment to enter into stream channels, therefore water quality would not be adversely affected.

**Resource Indicator and Measure 4**

The direct effect of Alternative B would be ground disturbance of approximately 3,312 acres from ground based harvesting equipment, 822 acres of noncommercial thinning from masticators and 2,207 acres of skyline yarding. Not all ground disturbance would result in DSC, although each of the proposed mechanized treatment methods has a predicted impact to the DSC (Reeves et al, 2011, Archuleta, 1997 and 1999, Siskiyou NF, 1997 and Bennett, 1982), which can influence sediment.

While Reeves offers a comprehensive list of expected detrimental effects, it appears these estimates may underestimate effects if certain conditions are present or absent. Twelve units would be near or exceed the 20% threshold under Alternative B. Restoration of DSC by subsoiling may be possible in units 62, 195, 208, 215 and 231 depending on the location of...
deeper soils. Suitability for subsoiling of deeper soils for the Mount Emily series for units 179 and 216 are based on hillslope gradients > 35%, so there may be opportunity to effectively subsoil portions of these units, based on field reconnaissance. GIS shows soil mapping unit 5776CN for units 187 and 217, however, the digital elevation model (DEM) indicates that only small portions of these units exceed 30% slopes, therefore portions of deeper soils can be effectively subsoiled.

Units 174, 181 and 215 are mastication units only and further impacts to DSC can be mitigated by ensuring that enough slash is present to prevent further compaction or prescribing low ground pressure equipment. Existing DSC for unit 215 is 30% and the soil scientist would identify areas suitable for subsoiling after treatments are implemented.

For ground based units currently below the 20% threshold, yarding would be restricted to existing skid trails and field reconnaissance by the soil scientist would identify areas suitable for subsoiling. Unit 216 is currently at 24% DSC and limiting skidding to existing trails would still not reduce DSC Unit 187 has inclusions of steeper slopes which would be avoided by ground based equipment. Digital elevation dataset indicates that unit 217 exceeds 35% gradient and therefore would not be suitable for ground-based harvest. An alternative harvest system would be needed for this unit.

Detrimental impact to soils with low bearing strength can be mitigated by restricting equipment operations when soil moisture is less than field capacity (soil is allowed to drain after becoming saturated). These soils can also be damaged by multiple vehicle passes when too dry, due to high content of silts and clays, which causes loss of soil structure as soil is turned into ‘powder’. Understanding the benefiting opportunities from fuel loading (slash) with yarding method may be an important factor to consider in the analysis. If harvest in a unit occurs before or as it transitions from moist to dry soil conditions; equipment may need to ride on slash to minimize DSC. Provided all mitigating factors are implemented occurs, the anticipated DSC for a given unit can be reduced below the 20% DSC criteria.

Log haul would occur on 90 miles of NFS roads. Alternative B would require an additional 38 haul routes totaling 13.7 miles. Temporary roads needed for access and log haul have been identified on 5.8 miles of existing nonsystem roads and skid trails and approximately 7.9 miles of new temporary access routes are needed to access several units.

Layout and staking of these routes in advance of vegetation treatments would occur with input from the soils scientist to avoid to the extent possible: meadows, lithosols, shallow soils, wet soils, soils with low bearing strength or other properties that would reduce the effectiveness of fully restoring productivity to these areas.

Design criteria for reducing or eliminating DSC after temporary road use include ripping, subsoiling, pulling berms, mulching, seeding and blocking future motor vehicle access (see Design Features in Appendix F of the Soils Report). Temporary road segments T04 (0.1 mi), T05 (0.3 mi) and T49 (0.3 mi) occur on shallow very shallow frigid, xeric soils where subsoiling is not a viable restoration technique. Restoration of these routes may require the addition of soil amendments (e.g. topsoil, biochar) to restore long-term soil productivity.

Beneficial effects to soil productivity from this alternative would occur when 5.8 miles of legacy roads and trails and 8.6 acres of landings are rehabilitated to reduce or eliminate compaction, improve infiltration and thereby reduce runoff and sedimentation. Some legacy trails would be used as temporary roads in the project and subject to removal per the forest plan. Contract
provisions of the timber sale would include obliteration of roads and trails per administrative authority, otherwise, KV funds would be collected for road and trail decommissioning.

**Cumulative Effects**

**Resource Indicator and Measure 1**

Cumulative effects are not expected from mass movement under normal weather conditions. The WEPP model indicates that a 50 year runoff event could increase erosion and sedimentation up to an order of magnitude regardless of hillslope treatment. Alternative B, when combined with the Asotin Prescribed Burn Project, would reduce the severity of wildfire as described in the Fuels Report. Effects of the modeled fire behavior would be reflected in lower soil burn severity, which would maintain higher amounts of ground cover, thus limiting soil exposure to post fire weather and reducing the potential for hillslope failures.

**Resource Indicators and Measures 2 and 3**

The Asotin Prescribed Burn would occur on about 7,943 acres within the Sunrise Project area. Under the modeled wildfire scenario, there would be a temporary addition of 0.09 tons/acre from the Lick Creek subwatershed and 0.11 tons/acre from the North Fork Asotin subwatershed. The combined effect of the Sunrise and Asotin Projects would reduce fuel loading and change fire regime condition class to desired levels at the subwatershed scale. Modelling indicates that the long term benefits of the combined Sunrise and Asotin Projects would result in a lower risk of large scale, high severity fire for decades, with a corresponding reduction in hillslope erosion and sedimentation as a result of future wildfires.

Based on the assumptions of the hydrologic ECA model and the literature cited, the proposed harvest and landscape burning would have a measurable effect to hydrologic functions (capture, storage, and release of water) when combined with the Asotin Prescribed Burn Project, assuming all activities occurred at the same time (see Hydrology Report). This combined effect may result in increased sedimentation as a result of streambank scour. In reality, commercial thinning and fuels treatments would occur asynchronously in time and space and these effects are not expected to be concurrently additive at the subwatershed scale, therefore streambed and bank derived sedimentation rates would not be measurably influenced by management activities at the subwatershed scale.

**Resource Indicator and Measure 4**

Proposed actions are designed with a considered balance between potential site impacts and the feasibility of operations. Previous management activities disturbed soils to varying degrees and extent, with some impacts still exceeding levels considered detrimental as described in the Forest Plan and Regional Guides.

Existing soil disturbance is scattered across the project, concentrated on more level ground that is readily accessed. It is primarily in the form of old skid trails and access roads that were sufficiently disturbed at the time of their use. They remain in exceedance of criteria for detrimental disturbance levels. This existing detrimental soil condition is often referred to as legacy disturbance, and is factored into assessments of cumulative effects for new management actions.

Mentioned in the existing condition discussion there is existing DSC from past activities (see Appendix E of the specialist’s report). Detrimental soil conditions created by equipment traffic and landings would increase from 141 acres to 712 acres under Alternative B or about 9% of
treatment units and 2% of the project area. Project design criteria such as subsoiling would occur on approximately 8.6 acres, thus there would be an overall reduction in DSC which would result in improved soil productivity.

Direct and Indirect Effects

Alternative C

The direct effects of implementing the Alternative C would be the removal of 12.1 MBF of timber from 2,550 acres (including development of skid trails, landings and 30 temporary road segments totaling 8.4 miles) and precommercial thinning of an additional 2,270 acres. Treatment of activity fuels would include mastication, lop and scatter, hand piling, grapple piling, pile burning, jackpot burning and/or broadcast burning. Prescribed fire is proposed for 14,060 acres of forest and grassland. Appendix D summarizes the results of the WEPP batch runs for the Lick Creek and North Fork Asotin Creek subwatersheds.

Resource Indicator and Measure 1

See Effects Common to All Action Alternatives.

Resource Indicators and Measures 2 and 3

Treatment Units

Direct and indirect effects in the Lick Creek subwatershed would be the same as Alternative B because the proposed treatments are the same.

Alternative C would treat approximately 2,970 acres less than Alternative B in the North Fork Asotin Creek subwatershed. Although the overall rate (tons/acre) of change in fire regime condition and erosion/sedimentation are similar to Alternative B, the amount of sediment (tons) would be less because fewer acres are treated. Initially, the potential sediment load from thinning and mastication areas would be less than Alternative B. The longer term benefit of treatments would be to reduce the severity of future wildfires commensurate with changes to desired condition classes, which would result in lower erosion and sedimentation rates. However, the net long-term benefit of wildfire risk reduction would not be as much as alternative B because 1,700 fewer acres with moderate to high fire behavior would be treated under Alternative C.

Effects in the Lick Creek subwatershed would be the same as Alternative B. All treatment scenarios for the Lick Creek subwatershed indicate that on a weighted average basis, there is little difference between treatments (see data in Appendix D of Soils Report).

The model runs for North Fork Asotin Creek (Table 3-54) indicate that at both scales, wildfire effects burning under current conditions would be mitigated by implementing density management treatments. Examining the difference between erosion/sedimentation rates at the landscape and unit scale indicates units proposed for treatment have the potential to produce twice as much sediment as the landscape as a whole and thus there is still a longer term benefit to implementing these treatments.

Table 3-54: Resource Indicators and Measures for Alternative C – NF Asotin Creek

<table>
<thead>
<tr>
<th>Resource Element</th>
<th>Resource Indicator</th>
<th>Treatment Type</th>
<th>Measure tons/ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) Soil Productivity</td>
<td>Erosion</td>
<td>Landscape Rx</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wildfire at Landscape scale</td>
<td>0.47</td>
</tr>
<tr>
<td>Resource Element</td>
<td>Resource Indicator</td>
<td>Treatment Type</td>
<td>Measure tons/ac</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------</td>
<td>------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>3) Water Quality</td>
<td>Sedimentation</td>
<td>Harvest/thinning Units</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rx fire Units</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wildfire at Unit scale</td>
<td>0.87</td>
</tr>
</tbody>
</table>

**Landscape Scale**

The landscape scale analysis using WEPP FuME produces the same results on a tons/acre basis as Alternative B because this model does not have an input for hillslope acres like the Disturbed WEPP batch model. However, as stated above for the mechanical treatments, fewer acres would be treated under Alternative C, and initially, there would be less potential sedimentation, but at the landscape scale, there would be a higher risk of moderate to high fire burn severity because less area is proposed for treatment under Alternative C.

**Resource Indicator and Measure 4**

The direct effect of Alternative C would be ground disturbance of approximately 1,641 acres from ground based harvesting equipment, 822 acres of noncommercial thinning from masticators and 912 acres of skyline yarding.

All units except 230 and 231 occur in Alternative C and the effects and rehabilitation of DSC described under Alternative B are the same for Alternative C.

Log haul would occur on 84 miles of NFS roads (see Transportation Report). Alternative C would require an additional 30 haul routes totaling 8.4 miles. Temporary roads needed for access and log haul have been identified on 5.0 miles of existing nonsystem roads and skid trails and approximately 3.4 miles of new temporary access routes are needed to access several units.

Design criteria for reducing or eliminating DSC after temporary road use include ripping, subsoiling, pulling berms, mulching, seeding and blocking future motor vehicle access (see Appendix F of Soils Report; Project Design Features). Temporary road segments T04 (0.1 mi) and T49 (0.3 mi) occur on shallow very shallow frigid, xeric soils where subsoiling is not a viable restoration technique. Restoration of these routes may require the addition of soil amendments (e.g. topsoil, biochar) to restore long-term soil productivity.

Beneficial effects to soil productivity from this alternative would occur when 4 miles of legacy roads and trails and 4.8 acres of landings are rehabilitated to reduce or eliminate compaction, improve infiltration and thereby reduce runoff and sedimentation.

**Cumulative Effects**

**Resource Indicator and Measure 1**

Cumulative effects would be similar to Alternative B.

**Resource Indicators and Measures 2 and 3**

Cumulative effects would be similar to Alternative B.

**Resource Indicator and Measure 4**

Proposed actions are designed with a considered balance between potential site impacts and the feasibility of operations. Previous management activities disturbed soils to varying degrees and
extent, with some impacts still exceeding levels considered detrimental as described in the Forest Plan and Regional Guides.

Existing soil disturbance is scattered across the project, concentrated on more level ground that is readily accessed. It is primarily in the form of old skid trails and access roads that were sufficiently disturbed at the time of their use. They remain in exceedance of criteria for detrimental disturbance levels. This existing detrimental soil condition is often referred to as legacy disturbance, and is factored into assessments of cumulative effects for new management actions.

Mentioned in the existing condition discussion there is existing DSC from past activities (see Soil Specialist Report). Detrimental soil conditions created by equipment traffic and landings would increase from 137 acres to 459 acres under Alternative C or about 9% of treatment units and 1% of the project area. Project design criteria such as subsoiling would occur on approximately 4.8 acres, thus there would be an overall reduction in DSC which would result in improved soil productivity.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Activity Area Detrimental Soil Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 to 10%</td>
</tr>
<tr>
<td>Alternative A</td>
<td></td>
</tr>
<tr>
<td>Alternative B existing acres DSC</td>
<td>123</td>
</tr>
<tr>
<td>Alternative C existing acres DSC</td>
<td>119</td>
</tr>
<tr>
<td>Alternative B - number of units</td>
<td>110</td>
</tr>
<tr>
<td>Total acres DSC</td>
<td>156</td>
</tr>
<tr>
<td>Alternative C - number of units</td>
<td>69</td>
</tr>
<tr>
<td>Total acres DSC</td>
<td>90</td>
</tr>
</tbody>
</table>

Irreversible and Irretrievable Commitment of Resources

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.12 Botany

This section incorporates by reference the Sunrise Botany Report/ Biological Evaluation (BE) contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report.

Introduction

A report of the existing conditions and analyzed effects from potential proposed actions to plants (and their respective habitats) that are federally-listed as threatened, endangered, or proposed for federal listing under the Endangered Species Act of 1973 as amended is summarized in this section, and available in full at the Pomeroy Ranger District office. This botanical report also discusses vascular plants, non-vascular plants (mosses and liverworts), and lichen species currently identified as sensitive by the Regional Forester of the Pacific Northwest Region.
Regulatory Framework

Federal laws

*Endangered Species Act*

The Endangered Species Act of 1973 (Public Law 93-2015, 1973) mandates all Federal departments and agencies to conserve listed species and to utilize their authorities in furtherance of the purposes of the ESA. Section 7(a) (2) directs all Federal agencies to insure that any action they authorize, fund, or carry-out does not jeopardize the continued existence of an endangered or threatened species or designated or proposed critical habitat. The Umatilla National Forest has one listed Threatened plant, Spalding’s Catchfly (*Silene spaldingii*). Spalding’s catchfly is documented in the project area.

*National Forest Management Act*

The National Forest Management Act of 1976 (Public Law 94-588, 1976) reorganized, expanded and otherwise amended the Forest and Rangeland Renewable Resources Planning Act of 1974, which called for the management of renewable resources on national forest lands. NFMA requires the Secretary of Agriculture to assess forestlands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of national forests.

*National Environmental Policy Act*

The National Environmental Policy Act of 1969 (Public Law 91-190, 1969) 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)].

Forest Service policy

*Forest Service manual 2672.1 sensitive species management*

Sensitive species of native plant and animal species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing. There must be no impacts to sensitive species without an analysis of the significance of adverse effects on the populations, its habitat, and on the viability of the species as a whole (USDA Forest Service, Forest Service Manual FSM 2670-2671. Threatened, Endangered and Sensitive Plants and Animals, Amendment No. 2600-2005-1, 2005).

*Forest Service manual 2672.4: Biological evaluation process*

The Forest Service shall review all planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened, proposed, and sensitive species. The biological evaluation is the means of conducting the review and of documenting the findings. Document the findings of the biological evaluation in the decision notice. Where decision notices are not prepared, document the findings in Forest Service files. The biological evaluation may be used or modified to satisfy consultation requirements for a biological assessment of construction projects requiring an EIS (Salwasser, Bosworth, & Lowe, 1995)

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.

Forest Service Manual 2070.2: Native plants policy objectives

1. Maintain, restore or rehabilitate native ecosystems so that they are self-sustaining, resistant to invasion by non-native invasive species and/or provide habitat for a broad range of species including, threatened, endangered, and rare species.
2. Maintain adequate protection for soil and water resources, through timely and effective revegetation of disturbed sites that could not be restored naturally.
3. Promote the use of native plant materials for the revegetation, rehabilitation and restoration of native ecosystems.

Forest Service Region Six revegetation policy

Use local native plant species to meet management objectives. Follow appropriate seed and plant movement guidelines.

Umatilla National Forest land and resource management plan

The Umatilla NF Land and Resource Management Plan (USDA Forest Service, 1990) includes the following goals, standards and guidelines for ecosystem diversity, threatened and endangered and sensitive species (TES), and wildlife habitat resources.

Forest plan goals

Forest Management Goal #6: Protect and perpetuate special areas and related resources for their unique values (page 4-2).

Forest Management Goal#11: Maintain or improve habitats for all threatened or endangered plant and animal species on the Forest, and manage habitats for all sensitive species to prevent the species from becoming threatened or endangered (page 4-2).

Forest Management Goal #13: Provide for a diversity of plant and animal communities and species consistent with overall multiple-use objectives. Maintain or enhance ecosystem functions to provide for the long-term integrity (stability) and productivity of biological communities (page 4-2).

Forest Management Goal #14: Provide areas for research and education purposes which are typical of unique natural ecosystems and are in undisturbed or nearly undisturbed condition (page 4-2).

Methodology

This report describes sensitive plant species, and their habitats, that are documented, or that may potentially occur in the planning area. Project design criteria (PDCs) are proposed to protect known sensitive plant populations, and to protect potential sensitive plant habitat. Potential direct, indirect, and cumulative effects of the alternatives on known sensitive plant populations,
and potential sensitive plant habitat, are presented. Effects analysis determinations follow definitions as outlined in Forest Service Manual 2672.42.

Rather than evaluate effects to so many species individually, this analysis focuses on how potential activities may impact habitats that may support sensitive plant populations. Species documented in the project area are addressed individually.

**Information sources**
A pre-field review determined 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:

- Region 6 Regional Forester Special Status Species List (USFS, 2015)
- USFS GIS mapping layers (vegetation, streams and wetlands, aerial imagery)
- Project GIS layers showing potential activity units
- United States Department of Interior Fish and Wildlife Service (USDI-FWS) website.
- Forest Service Natural Resource Manager database. This database includes information on where botanical surveys have been done on the forest in the past. It also contains information on sensitive plant populations.

**Affected Environment**
The scale of Analysis is the project area itself (33,150 acres). Since most plants do not move quickly, and no downstream effects are anticipated, it is not necessary to analyze effects to sensitive plants outside of the project area. The temporal context for effects analysis includes short term and long term effects. Short-term effects are considered to be one to two years after project implementation. These would generally be from direct effects such as destruction due to ground disturbance from heavy equipment, and incineration from burning. Long term effects for this analysis are considered to be more than two years after implementation of all activities. These effects would generally be from indirect effects such as changes in sunlight, erosion rates, hydrologic regimes, and changes in animal grazing patterns and intensity.

**Forest Plan – Management Goals (FP 4-2)** – Maintain or improve habitats for all threatened or endangered plant and animal species on the Forest, and manage habitats for all sensitive species to prevent the species from becoming threatened or endangered as well as provide for a diversity of plant and animal communities and species consistent with overall multiple-use objectives. Maintain or enhance ecosystem functions to provide for the long-term integrity (stability) and productivity of biological communities.

**Indicators used to analyze effects of the proposed actions:**

- Effects to threatened, endangered, and sensitive (TES) species
- Effects to Forest Service sensitive species

The United States Forest Service biological evaluation (BE) process was completed by a supervisory botanist for this project. This process includes a pre-field review of existing information, botanical surveys to search for sensitive plants, and development of project design criteria to protect both known sensitive plant populations and sensitive plant habitat. Potential direct, indirect, and cumulative effects to the federally listed plant, Spalding’s catchfly, were
analyzed. Potential effects to Region six designated sensitive plants for Washington State were also analyzed.

<table>
<thead>
<tr>
<th>Survey Record Number</th>
<th>Survey Dates</th>
<th>Sunrise Unit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark Darrach and Tom Brumbelow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>061400S01183-Sunrise 2014</td>
<td>06/30/2014 08/18/2014 08/19/2014</td>
<td>21, 22, 41, 44, 63, 71, 78, 161, 162, 166, 168, 215, 227 (325 acres total)</td>
</tr>
<tr>
<td>Mark Darrach and Joan Frazee</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Spalding’s catchfly (*Silene spaldingii*) is federally listed as threatened and documented in the project area. Additionally, there are five sensitive plant species documented in, or adjacent to, the project area. They are Arthur’s milkvetch (*Astragalus arthurii*), green-banded mariposa lily (*Calochortus macrocarpus var. maculosus*), Rollin’s biscuit-root (*Lomatium rollinsii*), mountain buttercup (*Ranunculus populago*), and Idaho gooseberry (*Ribes oxyacanthoides var. irriguum*). Of these, only the green-banded mariposa lily has been found in areas where there are proposed activities.

**Environmental Consequences**

**Direct and Indirect Effects**

*Alternative A (No Action)*

Under Alternative A, the No Action alternative, no new activities would be implemented in the project planning area. By definition, direct and indirect effects (40 CFR 1508.8), and cumulative effects (40 CFR 1508.7) result from the proposed action, and thus are not germane to the No Action alternative.

If the No Action alternative is selected, there would be no direct or indirect effects to sensitive plant populations, or potential sensitive plant habitat. If Alternative A is selected, it would lead to an effects call of “No Effect” (NE) for the federally listed plant Spalding’s catchfly. There would also be “No Impact” (NI) to any Region 6 Washington listed sensitive plant species.

**Cumulative Effects**

If the No Action alternative is selected, and a finding of no direct and indirect effects, there would be no activities undertaken in the project are that would add to cumulative effects.

**Direct and Indirect Effects**

*Alternatives B and C*

**Spalding’s Catchfly (*Silene spaldingii*)**

For both action alternatives, all documented populations of Spalding’s catchfly would be protected from all proposed activities. Since the proposed landscape burning is in high potential habitat for Spalding’s catchfly, additional surveys would be done in the landscape burn areas before burning commences. Special focus would occur in areas where any fire-lines may be dug, and also any areas where vehicles may be driven off road for burning and activities.
Since no Spalding’s catchfly plants are within any proposed cutting units, and project design criteria would prevent burning or construction of fire-lines through the documented populations, implementation of the proposed action would have “No effect (NE)” to Spalding’s catchfly populations. In addition, there would be no cumulative effects between the proposed action, the Peola or Asotin grazing allotments, or the Asotin Creek prescribed fire project. Therefore, U.S. Fish and Wildlife Service (USFWS) consultation for Spalding’s catchfly is not necessary for this project.

For both of the action alternative, there is no proposed tree cutting, or burning, in any populations of four of the documented sensitive species (Arthur’s milkvetch, Rollin’s biscuit-root, mountain buttercup, and Idaho gooseberry). Therefore, there would be “no impact (NI)” to documented population of these species for either of the action alternatives. Since there is no overlap in time or space between any proposed activities and these populations, there would be no cumulative effects from the action alternatives in relationship to other ongoing or planned activities in the project area.

**Green-banded Mariposa Lily (Calochortus macrocarpus var. maculosus)**

Two small populations of green-banded mariposa lily occur in areas that are proposed for landscape burning. Implementation of fire in documented populations of the green-banded mariposa lily populations would be done in the fall, after the plants have gone dormant for the year. Therefore, there would be no, or minimal, direct impacts to the populations. Due to uncertainty of the indirect effects of burning (changes in grazing patterns and potential increases in competition from non-native invasives), and the many acres of potential habitat that are in areas slated for prescribed burning, it is determined that implementation of the proposed action may impact individuals or habitat (MIIH) of the green-banded mariposa lily, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species. Since the two populations that occur in proposed burn areas overlap with permitted cattle grazing in the Peola allotment, there is a potential for minimal cumulative effects due to this project in relationship to ongoing activities. However, since these populations represent such a small proportion of the total number of plants in the project area, and across the forest and the rest of the species range, these cumulative effects are judged to be negligible.

For both action alternatives, the effects call for habitat and any undocumented populations of sensitive species affiliated with low to moderate elevation cliffs, rock outcrops, talus slopes, and riparian or wetland habitats is no impact (NI). This is because there are no ground disturbing activities proposed in these habitat types, and any fire that may occur would be low intensity, and would not negatively impact undiscovered populations that may be there. No heavy equipment would be used in aquatic and riparian dependent communities, and no mechanical slash piling would be allowed in those areas.

For both action alternatives, the effects call for habitat and any undocumented populations of sensitive species affiliated with lithosols and grasslands is may impact individuals or habitat (MIIH), but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species Construction of temporary roads may occur in some of these upland non-forested habitats. Botanical surveys and PDCs to avoid impacts to known populations would protect any currently undocumented populations that would potentially be impacted by road construction activities. The uncertainty about potential indirect effects of the interactions of burning and non-native invasive plants, and the inherent inability to survey 100% of proposed burn areas in grasslands, led to the overall call of MIIH, but will not likely
contribute to a trend towards Federal listing or cause a loss of viability to the population or species for lithosol and grassland habitats.

The species with greatest risk due to project activities from both action alternatives are those that occur in upland coniferous communities. The effects call for all sensitive plant species that occur in these upland forested areas is MIIH, but would not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species. The risk to upland coniferous communities is derived mostly from the use of heavy equipment. The ground disturbance associated with the use of equipment has a relatively high potential to negatively effect upland coniferous forest habitats and associated soils. In addition, indirect effects of altered hydrologic regimes, increased light, and changes in grazing patterns also contribute to the call of MIIH, but would not likely contribute to a trend toward federal listing or cause a loss of viability to populations of sensitive plant species.

The calls for both action alternatives for each sensitive plant population and potential habitat are the same. However, the relative risk to the various habitats (especially the coniferous forest habitats) is less for Alternative C than for Alternative B. This is due to the fact that Alternative C proposes significantly less ground disturbance and changes in tree canopy cover than is proposed in Alternative B.

Cumulative Effects

*Alternative B and C*

The time scale for this cumulative effects analysis covers the span from 1880, coincident with when significant mining and sheep grazing began to alter the area, to 2045 – 30 years into the future. It is thought that the 30-year timeline into the future should account for the potential of increasing temperatures and reduced moisture that are expected to occur if climate change proceeds as predicted. With the exception of small-scale projects such as stream enhancements and local meadow restoration efforts, it seems likely that for the next 30 years that this project would be the only landscape-scale project implemented by the Forest Service in the area. If a large wildfire were to impact the area, is likely that danger tree and possible salvage operations might be implemented. These activities would add an element of added disturbance, possibly significantly so, to some of the planning area. This is in addition to the effects of the fire itself.

It is highly likely that historical activities, particularly intensive cattle and sheep grazing, and timber harvest, mining activities, road construction, and fire suppression activities have destroyed populations, and altered habitats for sensitive plants. Since records of rare plant populations have only been kept for the last thirty years, historical effects are not quantifiable.

Since 1990, protection and management of sensitive species and their habitats in the form of project design features, avoidance, or other mitigations have been included in nearly all projects. This is in accordance with forest planning documents and policy set forth in FSM 2670. These policies have, and would continue to, reduce the potential of cumulative effects to sensitive plant populations and supporting habitats. Although some unquantifiable amount of cumulative effects are likely, it is assumed that they won’t be of a magnitude that will contribute a trend towards federal listing of sensitive plants.
Biological Determination of Effects to Threatened, Endangered or Sensitive Plant Species

_Federally listed plant, Silene spaldingii_

As stated previously above, no Spalding’s catchfly plants are within any proposed cutting units, and project design criteria would prevent burning or construction of fire-lines through the documented populations, implementation of the proposed action would have “No effect” to Spalding’s catchfly populations.

_Region 6 and listed Washington State sensitive_

There are no effects or minimal effects to Region 6 Sensitive Species listed plants from proposed activities in Sunrise project planning area. A determination of “No effect” or “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” was given for sensitive plant species.

Irreversible and Irretrievable Commitment of Resources

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.13 Invasive Plants

**Introduction**

Flora not known to exist in the Pacific Northwest prior to Euro-American settlement, but which readily displace native vegetation in disturbed or undisturbed sites are considered “invasive” for purposes of project effects analysis. The analysis also utilizes two broad categories of invasive plants, each considered in a different manner. Higher-priority invasive plants are those which regularly receive treatment under the 2010 Invasive Plants Treatment Project Record of Decision. Those species include rush skeletonweed, spotted and diffuse knapweed, high-density patches of yellowstar thistle, canada, scotch, and bull thistle, gypsy flower, dalmatian toadflax, and sulfur cinquefoil. Lower-priority species do not receive regular control treatments due to low density, wide distribution at present, low impacts on native flora and fauna, and/or difficulty of control. Lower-priority species include cheatgrass, medusahead, and ventenata.

The relative risk of displacement and invasion brought about by higher-priority invasive plant introduction and/or site disturbance is broadly described in this section as “low,” “moderate,” or “high.” In and of themselves, these terms do not quantitatively describe the exact probability that a particular species would become established as a result of human activities, because such quantification is essentially impossible. The intent of such classification, rather, is to allow comparison between alternatives and describe risk in qualitative but site-specific terms, and in ways useful to managers and decision-makers seeking to identify potential detrimental environmental effects and possible mitigation measures.

**Regulatory Framework**

Invasive plants are defined as “a non-native plant whose introduction does or is likely to cause economic or environmental harm or harm to human health” (Executive Order 13122).
The 1999 Executive Order on invasive species (direction found in Forest Service Manual 2080), and the National and Regional strategies for noxious weed management identify prevention as the preferred strategy for managing invasive plant species on National Forest Service lands.

The Sunrise project is intended to comply with the existing management direction, including the Invasive Plants Treatment Project EIS (decision July 2010). The portions applicable to the Sunrise project include prevention standards that are incorporated in Chapter 2 and found in the Invasive Plants specialist report.

**Methodology**

Treatment and monitoring are expected to be completed in conjunction with the activities included under Alternatives B and C. Treatment and monitoring would be conducted by the Noxious Weed Coordinator and other personnel on the Pomeroy Ranger District.

All of the known priority 1 noxious weed sites within the Sunrise project area were scheduled for herbicide treatment during 2015 and will have follow up treatments as prescribed in the Umatilla National Forest’s Invasive Plants Treatment Project (EIS), decision dated July 2010 and consistent with the 2005 Region 6 Invasive Plant ROD that amended the Umatilla Forest Plan in March 2006.

Inclusion of a number of design criteria in project activities will help to reduce the risk of invasive species introduction and spread. The criteria are intended to minimize ground disturbance and the exposure of mineral soils, reduce the introduction of weed seed into areas where ground disturbance is occurring, minimize the moving of any weed seed that already exists in planning area soils, and to re-establish weed-free ground cover as quickly as possible after any ground-disturbing activities. Past Forest Plan monitoring and annual evaluation reports have documented the effectiveness of these measures.

**Affected Environment**

**Scale of Analysis**

The geographic scale of this analysis is the 32,000-acre Sunrise project area. The temporal scale is bounded in the past by the earliest known period in which activities would have affected invasive plant establishment and distribution in ways that persist today (existing condition), and which have the potential to overlap in space and time with the direct and indirect effects of the activities included in Alternatives B and C. Because out-year planning efforts typically include a 5-year timespan, and harvest activities are expected to last 3 or more years, the temporal boundary of this analysis would also be approximately 8 years in the future (year 2025).

The majority of acres (30,720) in the Sunrise project area are currently at a low risk for noxious weed invasion. Approximately 1,810 acres are at a moderate risk, and 1,760 acres are at high risk. Weed infestations planned for treatment in the Umatilla National Forest Invasive Plants Treatment Project Environmental Impact Statement and Record of Decision (July 2010) and currently documented in the national Natural Resource Inventory System (NRIS) database include 11 species occurring separately or in combination at 51 sites on Forest Service land within the Sunrise planning area, covering approximately 1,250 acres (Table 3-57).
Table 3-57. Extent of higher-priority invasive plants known to occur within approximately 1 mile of the Sunrise planning area. Lower priority species are assumed to be widely distributed across grassy sites within the project area.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Infested acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rush skeletonweed</td>
<td>260</td>
</tr>
<tr>
<td>Spotted knapweed</td>
<td>470</td>
</tr>
<tr>
<td>Diffuse knapweed</td>
<td>200</td>
</tr>
<tr>
<td>Canada thistle</td>
<td>65</td>
</tr>
<tr>
<td>Bull thistle</td>
<td>74</td>
</tr>
<tr>
<td>Scotch thistle</td>
<td>407</td>
</tr>
<tr>
<td>Gypsy flower</td>
<td>257</td>
</tr>
<tr>
<td>Dalmatian toadflax</td>
<td>32</td>
</tr>
<tr>
<td>St. Johnswort</td>
<td>38</td>
</tr>
<tr>
<td>Sulphur cinquefoil</td>
<td>253</td>
</tr>
<tr>
<td>Yellowstar thistle</td>
<td>280</td>
</tr>
</tbody>
</table>

Note: Acres are rounded to the nearest 10 acres. The acre total in this table differs from the total described above because inventory polygons may contain more than one species.

Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)

The No Action alternative does not include any activities related to the Sunrise project. The spread of invasive plants from currently existing populations and off-Forest seed sources is not expected to be extensive, as existing populations, both on and off-Forest, are relatively small and isolated. Although some species of lower-priority for treatment are extensive across the grasslands in the project area, invasive plant density is highly variable, ranging from trace populations to near-monocultures in small, isolated areas. See the botany section of this document for further information on the relative abundance of native and non-native species in the project area.

Because there are no activities associated with Alternative A, there are no effects associated with activities. Nevertheless, failing to reduce existing fuels, in combination with reasonably foreseeable future fire suppression, means that future fires would burn at high intensity and severity in some areas, and likely to a greater extent than under Alternative A or B.

Direct and Indirect Effects

Alternatives B and C

Inspecting activity areas and haul routes before and during activities is expected to reduce any increase in weed infestations caused by the spreading of new seed, even if prevention measures are not 100% effective. These prevention measures would not affect spread of any older seed that may be present in the soil seedbank in the vicinity of pre-existing populations. It is not possible to calculate exact acreage reductions resulting from these weed treatments. However, the reductions in areas at risk would be proportional for each action alternative.
Invasion of an area by noxious weeds is known to be facilitated by ground disturbance, loss of plant cover, disruption of functioning native plant communities, and the presence of a weed seed source (Keeley 2004; R6 FEIS 2005). When addressing the spread of invasive plant species, it is impossible to accurately predict spread rates or exact locations of expanding weed populations; however, it is more feasible to assess the relative spread risk of various activities based on the degree of ground disturbance involved, and the proximity of existing weed populations that act as seed sources.

Using the methodology described above, levels of noxious weed infestation risk expected to occur as a result of implementing the activities included within action Alternatives B and C were allocated across the Sunrise planning area (Table 3-58). The purpose is not to predict the actual number of acres that may become infested, but to show the comparative risk of the different activities and alternatives. The effects of implementing activities included under Alternative B or C on spatial distribution invasion risk-classes for non-native, higher-priority are indicated in Table 3-58 below.

**Table 3-58. Low, medium, and high levels of risk to noxious weed invasion for action Alternatives B and C (acres).**

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>30,720</td>
<td>18,210</td>
<td>18,328</td>
</tr>
<tr>
<td>Moderate</td>
<td>1,810</td>
<td>6,360</td>
<td>8,090</td>
</tr>
<tr>
<td>High</td>
<td>760</td>
<td>1,400</td>
<td>1,390</td>
</tr>
</tbody>
</table>

Alternative B results in the highest number of moderate and high risk levels for higher-priority species, because the total area experiencing a ground disturbance is highest. Conversely, the extent of areas with a moderate and high risk level is lowest under Alternative A, because the total area experiencing a ground disturbance as a result of human activities is the least.

A brief literature review of effects associated with ecosystems and activities included in Alternatives B and C for lower-priority species are summarized in Table 3-59. In general, Alternative B would have greatest risk of lower-priority species invasion, because burning activities are the same for each action alternative, but tree-cutting and related ground-disturbing activities are more extensive under Alternative B. Experience with long-term monitoring in similar grasslands suggests that the near-term consequences would be for the density and distribution of lower-priority species to wax and wane across the landscape as various species compete for resources prior to and following recurring disturbance events.

**Table 3-59. General effects of selected vegetation species in response to fire disturbance.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Fire response</th>
<th>Study</th>
<th>Misc. Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowstar thistle (Centaurea solstitialis)</td>
<td>Neutral</td>
<td>Bushey 1995</td>
<td>Existing plants and seed on soil surface killed by heat, but able to quickly re-colonize</td>
</tr>
<tr>
<td>Yellowstar thistle (Centaurea solstitialis)</td>
<td>Negative</td>
<td>Zouhar 2002; Roche and White 2000; Martin and Martin 1999</td>
<td>Repeated, early-season burns are required for successful depletion of seed bank and control.</td>
</tr>
<tr>
<td>Yellowstar thistle (Centaurea solstitialis)</td>
<td>Modest, sustained increase</td>
<td>USDA Forest Service Fire Effects Information System database: yellowstar thistle. Accessed February 3, 2016.</td>
<td>A single mid or late-season fire usually kills most plants, but creates conditions for aggressive colonization and growth. Effects of heat on seed viability has not been studied.</td>
</tr>
<tr>
<td>Species</td>
<td>Fire response</td>
<td>Study</td>
<td>Misc. Notes</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cheatgrass (Bromus tectorum)</td>
<td>Initial reduction, quickly reaches pre-burn levels</td>
<td>Youtie et al. 1998</td>
<td>Moderately intense fire; consumed cheatgrass and medusahead seeds. Natives were FEID and PSSP</td>
</tr>
<tr>
<td>Cheatgrass (Bromus tectorum)</td>
<td>Variable over space and time</td>
<td>USDA Forest Service Fire Effects Information System database: cheatgrass. Accessed February 3, 2016.</td>
<td>A single mid or late-season fire usually kills most plants, but creates conditions for aggressive colonization and growth. Cheatgrass is a particularly strong competitor in the post-fire environment and quickly increases to occupy growing space made available by the burn. If other species, including native bunchgrasses quickly re-occupy a site as well, cheatgrass would not likely dominate.</td>
</tr>
<tr>
<td>Cheatgrass (Bromus tectorum)</td>
<td>Variable over space and time</td>
<td>USDA Forest Service Fire Effects Information System database: cheatgrass. Accessed February 3, 2016.</td>
<td>Cheatgrass response to fire depends on plant community and seed bank composition, density, and spatial distribution; season of burning; fire severity, frequency and patchiness; scale of consideration; post-fire management; and climatic conditions. Generalizations are difficult because each combination of climate, vegetation, and soil must be considered separately, as well as environmental differences at the time of burning and during subsequent plant reestablishment.</td>
</tr>
<tr>
<td>Cheatgrass (Bromus tectorum)</td>
<td>Negative</td>
<td>Antos 1983</td>
<td>Cheatgrass dominance may be avoided on sites that have sufficient cover of native perennials, proper management of livestock, and favorable climatic conditions for post-fire recovery. Three years after a severe wildfire on an ungrazed foothill mountain grassland in western Montana, cheatgrass cover was lower in burned patches than in unburned patches, and cheatgrass showed no indication of invading the burn. At that time Idaho fescue and bluebunch wheatgrass cover were similar to unburned levels, and rough fescue cover was slightly below unburned levels.</td>
</tr>
<tr>
<td>Medusahead rye Taeniatherum caput-medusae</td>
<td>Temporary increase</td>
<td>No known studies in literature</td>
<td>Professional experience in the vicinity indicates that medusahead rye typically increases in density and site occupancy following fire, likely for an extended period of time, but studies describing long-term effects may be lacking.</td>
</tr>
<tr>
<td>Spotted knapweed Diffuse knapweed (Centaurea spp.)</td>
<td>Data are insufficient to draw firm conclusions for different burn seasons and severities.</td>
<td>USDA Forest Service Fire Effects Information System database: Spotted and diffuse knapweed.</td>
<td>Plants readily re-sprout after fire and are aggressive colonizers.</td>
</tr>
<tr>
<td>Rush skeletonweed (Chondrilla juncacea)</td>
<td>Increase</td>
<td>USDA Forest Service Fire Effects Information System database: rush skeletonweed. Accessed February 3, 2016.</td>
<td>Plants readily re-sprout after fire and are aggressive colonizers generally, but post-fire colonization is not well-understood.</td>
</tr>
<tr>
<td>Species</td>
<td>Fire response</td>
<td>Study</td>
<td>Misc. Notes</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------</td>
<td>----------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Prickly lettuce (<em>Lactuca serriola</em>)</td>
<td>Temporary increase</td>
<td>Haskins and Gehring 2004; Turner and others 1997; Armour and others 1984; Youngblood and others 2006; Sutherland, unpublished data 2008; Floyd and others 2006</td>
<td>Successfully colonizes burned sites but most studies report decreases over 2-10 years.</td>
</tr>
<tr>
<td>Scotch cotton thistle (<em>Onopordum acanthium</em>)</td>
<td>Initial increase, generally decrease over time</td>
<td>Professional opinion; anecdotal observations</td>
<td>In isolated cases, known to successfully colonizes some burned sites and can persist for many years. Generally not an aggressive persistent invader in this area.</td>
</tr>
<tr>
<td>Sulfur cinquefoil (<em>Potentilla recta</em>)</td>
<td>Neutral or increase</td>
<td>Bushey 1995</td>
<td>Tap-rooted, long-lived perennial able to quickly re-sprout after fire. Able to quickly colonize a site.</td>
</tr>
</tbody>
</table>

Cumulative Effects

*Alternative A (No Action)*

For the No Action alternative, the Sunrise project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action.

**Cumulative Effects**

*Alternatives B and C*

Existing infestations are a result of past ground disturbing activities with effects that overlap in space and time with the direct and indirect effects of the activities proposed under each of the action alternatives. Domestic livestock and wildlife can spread invasive plant seeds throughout the planning area. The project area includes an active cattle allotment (see Range section) with a season of use from mid-June through mid-October. As a result, cattle are within the planning area when seed maturity occurs and likely serve as a vector for seed spread. There would likely be some level of cumulative effects associated with cattle grazing and activities associated with this project. Those effects could include the spread of existing infestations and the establishment of new invasive species, but precise quantification of spread risk is very difficult and uncertainty is extremely high.

Design criteria would reduce the cumulative effects, they would likely not be eliminated; however, grazing activities in Asotin and Peola C&H grazing allotments are managed to reduce detrimental impacts on soils and native plant communities and minimize opportunities for invasive plant establishment outside of road corridors. As a result, grazing activities in Asotin and Peola C&H grazing allotments are not likely to expand areas of moderate or high risk above and beyond what is expected to occur as a result of implementing actions included under any of the alternatives of the Sunrise project.

Low risk of spread does not equate to zero risk. The spread of invasive plants from currently existing populations and off-forest seed sources would continue at the current level. Animal and vehicle vectors would likely be the primary means of seed introduction into the planning area. The following past, present, and reasonably foreseeable future actions were considered, but, for the reasons cited, did not alter the calculations of acreages in the high and low risk categories for weed spread.
The following items may increase the potential for invasive plant species establishment and spread, but are not expected to cumulatively increase the amount of areas considered as high risk to invasive plant establishment because they occur along roadways, which are already classified as high risk. However, acreage placed at high risk from these activities is speculative, so are not evaluated numerically.

Larger vehicles traveling away from roadbeds can increase potential weed habitat by disturbing and/or compacting soils, and by damaging and weakening existing vegetation. They can also carry and disperse weed seed wherever they go. While system roads are mapped, and can be efficiently patrolled for detection and treatment of associated weed populations, any infestations along unauthorized, user-built roads are less likely to be rapidly found and treated. Acreage where this may be occurring is unknown.

The use of OHVs away from designated roadbeds or trails raises concern for invasive species spread, but these activities are not expected to occur outside areas currently mapped as high risk to invasive plant establishment. While OHVs cause less ground disturbance than larger vehicles such as pick-ups, they can access more varied terrain. If used for unauthorized cross-country travel they can act as wide-ranging seed dispersal vectors, potentially introducing weed infestations into remote and seldom-frequented sites. The amount of unauthorized land use by vehicles is unknown, but it is apparent that at least some such use occurs in portions of the planning area, increasing the risk of spreading invasive species to remote spots where they are not easily detected or treated.

Irreversible and Irretrievable Commitment of Resources

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.14 Visual Resources (scenery)

Introduction
The scenery resource report analyzes the project effects to the scenery resources that are comprised of the positive elements of the natural appearing and culturally valued landscape. The indicator used to measure the effects to scenery resources is visual quality. Visual quality is an indicator of the desired level of excellence based on the physical and sociological characteristics to an area and refers to the degree of acceptable alteration of the characteristic landscape. Visual alterations are those that detract from the natural appearing landscape such as straight linear features, geometric forms, and colors that contrast with the natural landscape. The effects that are measured are those that are visible from the viewing platform that is designated by the Forest Plan as a sensitive travel route. The Pomeroy-Grouse Flat Rd, Forest Road 40 is the viewing platform from which the scenery resource analysis is analyzed.

Regulatory Framework
The National Environmental Policy Act of 1969 (NEPA) states that it is the “continuing responsibility of the Federal Government to use all practicable means to assure for all Americans, aesthetically and culturally pleasing surroundings.” NEPA also requires “A systematic and interdisciplinary approach which would insure the integrated use of the natural and social sciences and the environmental design arts into planning and decision-making which may have an impact on man’s environment.” To accomplish this, numerous Federal laws require
all Federal land management agencies to consider scenery and aesthetic resources in land management planning, resource planning, project design, implementation, and monitoring. Integration of this scenery analysis assures the Sunrise project is consistent with scenery-related Forest Plan direction, Forest Service policies, and applicable elements of Forest Service Visual Management and Scenery Management systems.

**Methodology**

The viewshed from FSRD 40 is analyzed to determine visibility from bare earth modeling. A viewshed analysis is utilized to determine visibility by using a digital terrain model to determine what is visible from points located on the route at ¼ mile intervals. An offset from ground level of 6 feet is used to assimilate the height of a human standing on the road or riding in a tall vehicle. (Visibility acreages are determined by use of digital terrain modeling known as “bare earth modeling” that does not take into account and screening from remaining trees or shrubs. It is a worst case scenario and visual impacts will not occur on all visible acres. The acreages calculated for visibility will high and the visible acreage shows potential for impacts related to management activities, rather than visible acres of impact.)

Google Earth, and field observation were also used, and it has been determined that there are very few opportunities to see into the project area from FSRD 40 due to terrain and vegetation in the foreground.

Along with visibility, the discernibility of the impact from various distance zones is considered by use of distance zones: foreground (0 to ½ mile) fg, middleground (1/2 to 3 miles) mg, and background (3 miles to 5 miles+) bg. There are other factors that affect discernibility such as the angle of view, and duration of view.

Foreground impacts that expected to be discernible are impacts such as individual tree stumps and slash. From middleground distances, texture is normally characterized by the masses of trees in stands of uniform tree cover. Individual tree forms are usually only discernible in very open or sparse stands. From background distances, texture is difficult to discern in continuous forest landscapes. In very open or sparse timbers stands, texture is seen as groups of patterns of trees. Ground disturbance is apparent if seen from direct angles and are contiguous and linear. (Ag Handbook 462, pg. 7)

Visual Quality Objectives are used as measures of acceptable alteration within the Forest Plan standards and guides. In this project area the visual quality objective for the foreground view is partial retention, and in middleground views, the visual quality objective (VQO) is modification. The Partial Retention VQO states that management activities remain visually subordinate to the characteristic landscape. It is expected that the project impacts meet the VQO within the first year following the conclusion of the project harvest activities. The Modification VQO states that management activities may be visually dominate the original characteristic landscape but must borrow from the naturally established form line color or texture.

The effects analysis considers the impacts of the vegetation management treatments and the harvest activities that are utilized to carry out those treatments.

**Affected Environment**

**Scale of Analysis**

The geographic area or spatial bounds for the cumulative effects to scenery resources is determined by typical experience of the viewers. There are local viewers who utilize the Sunrise
project area for various recreation experiences and there are travelers who experience the area as they travel through via the Pomeroy-Grouse Rd, Forest Road 40. The visual experience is the forested setting of Sunrise project containing the entire Asotin Creek Inventarioed Roadless Area (IRA) and is adjacent to Wenatchee and Tucannon IRAs. The project area is adjacent to private property on the eastern boundary and includes a section of land owned by the Washington Department of Natural Resources and portions of sections owned by Washington Department of Fish and Wildlife that are located within the project area (no activities are proposed on WDNR or WDFW land). This geographic boundary is determined by the viewing distance to which treatments can be visually discerned and the setting in which the project is within.

The temporal bounds are related to the longevity of visual impacts of the reasonable and foreseeable activities in the geographic boundary. Visual impacts that can be discerned from a middleground to background viewing distance are of such scale that the effects could overlap spatially therefore these are the visual impacts to be considered. Timber harvest that creates unnaturally shaped or sized opening via clearcutting or textural contrasts that are not in keeping with the historical range of variability are generally used as examples of harvest effects that may temporally overlap. Once an opening has revegetated and reached a height of 20 feet, the visual impact has been mitigated or restored. Within this area the height of 20 feet can be reached within 20 to 30 years depending on the topography, aspect and climate. Therefore, 30 years is the temporal bounds for the cumulative analysis of effects.

The project area sits at the upper reaches of the Asotin River drainage that runs east, north east. The area covers the upper plateau and also drapes down into the draws of the Asotin River Drainage. The draws are timbered with views of previous harvest units being very apparent from secondary roads. Primarily viewed from Forest Road 40, the Pomeroy-Grouse Flat Road that runs along the eastern rim of the Tucannon River drainage. However, the primary views are limited from Forest Road 40. Foreground timber and topography screen much of the middleground areas from view. Along the road there are some areas of open grassy areas while the timber stands are quite dense. In some views there is visual evidence of past harvest activity where units stand out as an unnatural appearing rectangular form and strong distinct edges. The visual quality ranges from partial retention to maximum modification from secondary views.(views from routes that are designated as sensitive routes)

**Visual Quality**

Visual Quality is measured on the Umatilla National Forest through Visual Quality Objective levels defined by the USFS Visual Management System’s Chapter 1 USDA Handbook # 462. These levels and descriptors of how people perceive them are shown in Table 3-60.

The existing visual quality varies from partial retention to modification. The area currently shows signs of harvest activity, much like a patchwork quilt with varying degrees of thinning and cutting of various sized and shaped units. The landscape topography is not a uniform canvas, but dissected by drainages that provide an array of slopes angling in various directions.

Views within the foreground of the Forest Road 40 show some signs of harvest activities. There are stumps remaining visible from previous harvest activities, and there are remnants of skid trails in some units along the road, but the visible impact is minimal and do not detract from the natural appearance of the foreground views, meeting the visual quality objective of partial retention.
Table 3-60. Visual Quality Objectives and definitions

<table>
<thead>
<tr>
<th>Visual Quality Objective</th>
<th>Visual Quality as people perceive it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservation</td>
<td>Unaltered, visually complete or intact</td>
</tr>
<tr>
<td>Retention</td>
<td>Unnoticeably altered</td>
</tr>
<tr>
<td>Partial Retention</td>
<td>Slightly altered</td>
</tr>
<tr>
<td>Modification</td>
<td>Moderately altered</td>
</tr>
<tr>
<td>Maximum Modification</td>
<td>Heavily altered</td>
</tr>
<tr>
<td>Unacceptable Modification</td>
<td>Unacceptably altered</td>
</tr>
</tbody>
</table>

Views from middleground distances show management activities that dominate the natural landscape. Slopes are often broken up visually by large harvest units reaching from the top of the ridge to the edge of the riparian buffer, and alternate with remaining timber stands from one end of the drainage to the other. Many of the previous harvest units have straight line edges that appear unnatural. The scale of many of the existing harvest units are larger than natural openings. These impacts dominate the natural appearing scenery, meeting modification.

Sensitive routes and areas
The route identified in the Forest Plan as a viewshed for visual concerns and potentially affected by the Sunrise project is Forest Road 40, the Pomeroy- Grouse Flat Road. The views from Grouse Flat Road are varied in foreground, and middleground and background views into the project from the road prism platform looking into the project area from the southern edge. Some views into the Asotin drainage are afforded where the road traverses the edge of the head of the draw.

Age Class and Structural Stages within Partial Retention
The desired mix of age classes within foreground partial retention is 20% for each of the following age classes, as determined by the Forest Plan. The existing, extent and proportion of foreground area are shown in Table 3-61.

Absent high-severity disturbances in the seen-area foreground, all age classes are trending towards desired conditions, except the 0-36 age class, which is roughly analogous to the stand initiation structural stage.

Table 3-61. Seen foreground age classes with Partial Retention Visual Quality Objective

<table>
<thead>
<tr>
<th>Age class</th>
<th>Existing acres</th>
<th>% of total</th>
<th>Long-term trends and causes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Existing</td>
<td>Desired</td>
</tr>
<tr>
<td>0-36</td>
<td>211</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decreasing: more areas are expected to leave this class than enter it, over time, because a lack of high-severity disturbance prevents recruitment into the class.</td>
</tr>
<tr>
<td>37-72</td>
<td>454</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decreasing: more areas are expected to leave this class than enter it, over time, because only about half the acres are available from the 0-36 year class.</td>
</tr>
<tr>
<td>73-108</td>
<td>631</td>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decreasing: more areas are expected to leave this class than enter it, over time, because only the pool of acres expected to recruit into this class are only about 60% of the acres expected to transition away from this class.</td>
</tr>
</tbody>
</table>
Visibility

The visibility analysis is a detailed, site-specific look at the viewshed using “bare earth modeling,” without taking into account the vegetation that screens much of the area beyond foreground views. Table 3-62 shows the acres in the project that are visible by Visual Quality Objective.

Table 3-62. Visible Acres by Visual Quality Objective.

<table>
<thead>
<tr>
<th>Visual Quality Objective</th>
<th>Total Acres</th>
<th>Total Visible</th>
<th>Percent Visible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Retention</td>
<td>7544</td>
<td>667</td>
<td>8%</td>
</tr>
<tr>
<td>Modification</td>
<td>9195</td>
<td>1905</td>
<td>20%</td>
</tr>
<tr>
<td>Maximum Modification</td>
<td>15398</td>
<td>1746</td>
<td>11%</td>
</tr>
</tbody>
</table>

The areas that are more likely to be seen are the foreground areas (707 acres). Of those foreground acres, 266 acres designated Partial Retention, and 426 are designated as Modification. Visible treatment acres will be disclosed by alternative in the Effects Analysis.

Created openings

Created openings were designated by identifying forest areas in the stand initiation structural stage. The stand initiation stage was used as an analogue for created openings because the dominant canopy height of forests in this stage are generally less than 20 feet, which is the standard for created openings for the A4 Management Area. The extent of visible (from Forest Road 40) created openings in the foreground and middleground with a Partial Retention Visual Quality Objective is described in Table 3-63. The percentage of forest in created openings relative to total seen foreground and middleground areas managed with a Partial Retention Visual Quality Objective is described in Table 3-64.

Table 3-63. Created Openings

<table>
<thead>
<tr>
<th>Area in created openings (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Foreground</td>
</tr>
<tr>
<td>Middleground</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Table 3-64. Created Openings in Even and Uneven-aged Systems

<table>
<thead>
<tr>
<th>Even and Uneven-aged Silvicultural Systems</th>
<th>Max percent harvest/decade</th>
<th>Max percent of area in created openings post-harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>foreground</td>
<td>middleground</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>foreground</td>
<td>middleground</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Environmental Consequences

In this section, the direct, indirect, and cumulative effects of Sunrise project management Alternatives on visual resources are discussed for Alternative A, and in combination for Alternatives B and C. Past, present, and reasonably foreseeable future activities are incorporated together in the assessment of existing conditions and effects associated with the Sunrise project.

Direct and Indirect Effects

*Alternative A (No Action)*

Because there are no activities associated with Alternative A, there would be no effects from the No Action Alternative. The indirect effects would include continued visual impacts that need to be rehabilitated where prior harvest units stand out against the surrounding timber stands. The age class/structural stage mix trends would continue to decrease in stand initiation and stem exclusion while understory reinitiation and old forest stages would likely increase slightly. The existing visual quality would remain at maximum modification to partial retention with visual elements that detract from the natural landscape and dominate views.

*Alternatives B and C*

The visual quality objectives of the project area would be maintained by all alternatives. The project proposed harvest would help blend with prior harvest units and give the area a more natural appearance overall by treating areas adjacent to these prior harvest units in a manner that transitions the density of adjacent stands to reduce the stark line between clearing and dense forest. The project would meet the visual quality objectives of the Forest LRMP. The expected effects related to the vegetation treatments and harvest methods are described in general here, followed by brief discussion of the visibility and effect analysis.

*Intermediate* vegetation treatments open stands up creating a texture difference in middleground views, making the units appear less dense, with clumps of trees of the preferred species, sizes, and crown condition. The effect is expected to create a natural-appearing mosaic with variable levels of residual density. *Regeneration* vegetation treatments create openings that create a larger scale mosaic while still appearing natural, but with more of a change from existing density and texture. Unit edges are scalloped and feathered to soften the edge appearance and avoid straight linear forms and shadows.

*Logging systems* result in varying visual impacts. Ground-based operations create ground disturbances such as duff and soil disturbance from tracked vehicles, skid trails and skyline corridors. Log landings are located in large openings that are used for continuous vehicular use, turning and moving to receive, stack, and load logs on trucks. Visual disturbances caused by harvest activity are expected to be reduced by design features addressing occurrences such as gouging by dragging logs. By suspending the butt end while dragging the logs, gouging in skid
trails does not occur. Harvest activities are limited seasonally to times of dry soil conditions to avoid rutting from equipment. Slash, duff and biomass is retained to encourage vegetation recovery. Stumps are cut in foreground areas of Forest Road 40 are to be cut at a height less than 6”. These disturbances are primarily foreground impacts, discernible within 0-1/2 mile, and more extensively within the immediate foreground (300ft), lasting for a short duration. Past experience in nearby areas suggests that within one to two growing seasons, shrubs and forbs usually recover, breaking up the visual elements of linear disturbances and color contrast of exposed soils.

**Fuels Treatments** include prescribed burning, landing pile burning and grapple pile and burn. The expected burn unit affects are expected to be notable but appearing as natural occurrences, burning at varied severities, and creating small mosaics, primarily by underburning the ground layer vegetation and saplings with some small pockets of mortality. The expected effects for piling and burning are minimal, limited to the landing locations primarily, with a large pile burned within a year of the end of the harvest contract. This is a short term with positive visual effects on slash left by tree-cutting and pruning activities. Landings would not be visible from Forest Road 40. Some mastication is planned, however these areas would be in middleground and background viewing distances where it is not expected to be discernible.

The visibility from Forest Road 40 of the project area is limited primarily by local topography. The road travels along the rim looking down into the Tucannon River drainage to the west while the project area is to the east of the road. Often, ridges, knolls, and small hills limit views from the road into the project area. There are 7782 acres of proposed treatment units. Of those, 2073 acres are determined to be visible by the viewshed analysis using a bare earth digital terrain model. This model does not account for timber stands in the foreground that would screen most of the area beyond the foreground stands.

The views that provide visual access to middleground views are often of existing past harvest units that appear blocky and unnatural. Alternative B proposes units that are adjacent to many of these units and would create a more uniform appearance and reduce contrast between existing plantations and adjacent unharvested stands. Foreground views are a mix of timber stands and small openings with high plateau grasses. Alternative B is expected to reduce stand density in many locations and in some areas create small (generally less than ½ acre in size) openings, thereby creating diversity in the roadside views.

The areas that are most likely to be viewed are the foreground acres along Forest Road 40, which are approximately 760 acres. These foreground acres would be opened up to varying degrees, addressing structural stage and species composition objectives. Harvests in the foreground would occur with variable levels of retention and sizes of retained trees, with an emphasis on retaining the largest trees of desirable species and crown characteristics. Tree-cutting activities would generally resemble a thinning with the foreground retaining a moderate density level in most areas, but small openings would be created in some units along Forest Road 40. Table 3-65 shows the breakdown of treatments by Visual Quality Objective for Alternative B. Table 3-66 shows the percentage of acres treated broken out by Visual Quality Objective for Alternative B. The majority of treatments are in Modification or Maximum Modification where the activity effects are expected to remain consistent with visual objectives. As described in Chapter 2, some regeneration units may resemble a thinning, where the intent is to retain moderate amounts of residual canopy and regenerate shade-tolerant species or small groups of shade-intolerant species.
Table 3-65. Silvicultural Prescription Acres by Visual Quality Objective (Alt. B)

<table>
<thead>
<tr>
<th>Silv. RX</th>
<th>Retention</th>
<th>Partial Retention</th>
<th>Modification</th>
<th>Max. Mod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>0</td>
<td>325</td>
<td>2470</td>
<td>2859</td>
</tr>
<tr>
<td>Regeneration</td>
<td>0</td>
<td>99</td>
<td>930</td>
<td>1097</td>
</tr>
</tbody>
</table>

Table 3-66. Percentage of Acres Treated by Visual Quality Objective (Alt. B)

<table>
<thead>
<tr>
<th>Percent Treated</th>
<th>Retention</th>
<th>Partial Retention</th>
<th>Modification</th>
<th>Max. Mod</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>5%</td>
<td>44%</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-67 shows the breakdown of treatments by Visual Quality Objective for Alternative C. Of total cutting acres under Alternative C, 1096 acres are determined to be visible from Forest Road 40 via the digital terrain modelling. However, the foreground acres are more likely to be visible.

Table 3-67. Silvicultural Prescription Acres by Visual Quality Objective (Alt. C)

<table>
<thead>
<tr>
<th>Silv. RX</th>
<th>Retention</th>
<th>Partial Retention</th>
<th>Modification</th>
<th>Max. Mod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>0</td>
<td>171</td>
<td>1383</td>
<td>2320</td>
</tr>
<tr>
<td>Regeneration</td>
<td>0</td>
<td>50</td>
<td>291</td>
<td>601</td>
</tr>
</tbody>
</table>

Table 3-68 shows the percentage of acres treated broken out by Visual Quality Objective. The majority of treatments are in Modification or Maximum Modification, where the activity effects would remain consistent with visual objectives.

Table 3-68. Percentage of Acres Treated by Visual Quality Objective (Alt. C)

<table>
<thead>
<tr>
<th>Percent Treated</th>
<th>Retention</th>
<th>Partial Retention</th>
<th>Modification</th>
<th>Max. Mod</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>4%</td>
<td>30%</td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

Alternatives B and C would directly and indirectly address some of the trends related to age class in foreground partial-retention areas. The desired mix of age classes is 20 percent of each of the following age class and structural stages in the Forest Plan, but the two oldest age classes in the Forest Plan have been lumped for this analysis, to allow for comparison to stand structural stages; thus, the objective for the 109-181 age class is 40% of seen area in the foreground. Short and long-term trends are displayed in Table 3-69 for existing conditions (Alt. A) and for action alternatives (Alts. B and C). Trends associated with each alternative are analogous to direct/indirect effects, to the extent that trends differ. For example, by creating some areas of stand initiation structural conditions, Alts B and C would for the short-term reverse a (currently) decreasing trend that would have occurred under the no-action alternative.
### Table 3-69. Visible Foreground Age Class in Partial Retention and Trends by Alternative.

<table>
<thead>
<tr>
<th>Age class</th>
<th>Structural stage</th>
<th>Existing acres</th>
<th>% of total</th>
<th>Extent trends over time relative to current conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Existing</td>
<td>Desired</td>
</tr>
<tr>
<td>0-36</td>
<td>SI</td>
<td>211</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>37-72</td>
<td>SE</td>
<td>454</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>73-108</td>
<td>UR</td>
<td>631</td>
<td>48</td>
<td>20</td>
</tr>
<tr>
<td>109-181</td>
<td>Old Forest</td>
<td>18</td>
<td>1</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: Structural stages listed include Stand Initiation (SI), Stem Exclusion (SE), Understory Reinitiation (UR), and Old Forest. Short-term effects are associated with a 0 to 20-year time frame, and long-term effects are associated 20 years or more.

Under any alternative, age classes remain stable when roughly equal areas of forest enter and exit the age class over time. Forests enter the 0-36 age class through high severity disturbance—most often wildfires or tree-harvests. Under Alternative A, a lack of disturbances would cause the amount of forest in the 0-36 age class to gradually decrease over time. The relatively small extent of tree-cutting activities under Alternatives B and C would have an indirect effect of slightly decreasing the extent of the 0-36 age class in the short term, because it would not likely compensate for the overall amount of forest transitioning out of that age class over the long term.

Under each alternative, forests that enter the 109-181 age class do so by persisting over long enough periods of time (greater than 109 years since stand origin). Alternative A would result in short and long-term increases of forest in this age class because endemic disturbances (insect, disease, or small wildfire) would likely be less extensive than the amount of forest transitioning into the 109 to 181-year age class. Alternatives B and C would have the direct effect of stabilizing the extent of the age class over the short-term, because a roughly equal amount of forest would leave the class via landscape burning disturbances and enter the class through forest growth. Additionally, tree-cutting activities proposed under Alternatives B and C would not reduce the amount of forest in this class. Over longer periods of time, more areas of forest are expected to enter the 109 to 181-year age class than would leave it through disturbances.

For some age classes/stand structures Alternative B maintain a stable proportion of the landscape or move conditions toward the desired extent, because it would convert some forests in the over-represented 37-27 (SE) and 73-108 (UR) age classes to the under-represented 0 to 36-year age class. This alternative would maintain the visual quality objectives, and potentially improve areas of maximum modification (areas of past harvest) for reasons explained elsewhere in this section. Alternatives B and C would meet the visual quality objectives, and potentially improve areas of maximum modification. Alternative C proposes the same treatment methods, but to a lesser degree in consideration of wildlife resource concerns.

Alternative A indirectly allows existing trends to continue. Alternatives B and C address structural stages in similar ways, but to a differing extent, as described in Chapter 2. The proposed alternatives have very little differences between them as they relate to scenery resources overall. All proposed alternatives would meet the visual quality objectives established in the Forest Plan.
Past Activities are visible within the project area and in adjacent areas within the viewshed of Forest Road 40. Those that are within the project area do not presently dominate the viewshed as seen from Forest Road 40. Many of these effects would be reduced by the activities proposed by Alternative B and C, addressing prior units that are blocky and unnatural-appearing by softening edges between harvested and previously unharvested forest. There are units west of Forest Road 40, adjacent to the project area. Units are still evident from the Teal Salvage sale along the west of the Forest Road 40. Previous effects of the Teal timber sale are accounted for in the analysis of existing conditions and not expected to alter the degree of effects disclosed above for Alternatives B and C.

There are present and foreseeable activities that are expected to create effects. Prescribed fire efforts in and around the project area would create small pockets of scorching and mortality. These effects are natural appearing and are expected to occur at a scale that is very minimal. Grazing, road and trail maintenance, and recreational uses are not expected to affect scenery resources to any measurable degree.

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

### 3.15 Inventoried Roadless Areas (IRA), Potential Wilderness Areas (PWA) and other Undeveloped Lands

This section incorporates by reference the Sunrise Inventoried Roadless Areas, Potential Wilderness Areas and Undeveloped Lands Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Introduction**

Within a National Forest, though already a place of solitude and contemplation, there are special areas designated specifically to preserve these unique characteristics. Wilderness, Potential Wilderness Areas, IRAs, and undeveloped lands are set aside to assure future generations have equal access to seclusion and introspection.

**Regulatory Framework**

It is important to accurately define terminology found in this section, as a wide range of terms have been used by respondents during scoping, the courts, and the Forest Service itself. The terms and definitions below will be used in this site-specific analysis. The following four resource topics are based on current law, regulation, agency policy, and the Umatilla Land Resource Management Plan (Forest Plan), as amended.

**Wilderness**

A wilderness area is designated by congressional action under the Wilderness Act of 1964 and other wilderness acts. Wilderness is undeveloped Federal land retaining primeval character and influence without permanent improvements or human habitation (Umatilla Forest Plan, page GL-45). There is, however, no congressionally designated wilderness within the project area, and no project activities are proposed in the wilderness. The proposed project would have no direct,
indirect or cumulative effects on designated Wilderness areas; therefore there will be no further
discussion of the effects to designated wilderness in this report.

**Potential Wilderness Areas (PWA)**
The Umatilla National Forest conducted a Potential Wilderness Area (PWA) inventory for forest
plan revision and updated the inventory in 2010 (2010 PWAs) consistent with agency policy at
that time. Only acres of land inventoried as PWA were carried forward into the forest plan
revision evaluation and wilderness recommendation process. The forest plan draft EIS was
released in 2014 and the 2010 PWA inventory was used to evaluate, analyze, and recommend
wilderness in the alternatives.

**Inventoried Roadless Areas (IRA)**
These areas 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 Forest Plan, FEIS, Appendix C;
however some localized, minor differences in boundaries may exist.

**Undeveloped Lands**
Undeveloped lands are simply lands that do not have a history of management activity (see
methodology), whether it is timber harvesting, road construction, or other trammels. These areas
are not necessarily designated, but rather identified as undeveloped, and are considered in the
analysis of each action alternative. Undeveloped lands do not contain development within 300
feet of maintenance level 1, 2, 3, 4, or 5 Forest Service roads or open County roads.
Undeveloped lands analysis does not reference the planning handbook (FSH 1901.12) or the
Wilderness Act as they are not relevant to this analysis.

**Methodology**
The identification of IRA, PWA and other undeveloped lands was conducted through a sequence
of GIS and database analyses, field verification, and application of professional judgment. The
judgment applied was situational and instance by instance. The judgment applied was situational
and instance by instance. Lands 300 feet on either side of the centerline of all maintenance level
1, 2, 3, 4, and 5 Forest Service roads and open County Roads are considered developed due to
evidence of stumps from firewood cutting and hazard tree removal, dispersed campsites, and
other activities allowed under the current Forest Plan. Examples of typical situations that
required applications of professional judgment included, but are not limited to:

- Determining whether other improvements or evidence of past human activities are
  substantially noticeable.
- Extending placement of polygon boundaries to the edges of development for purposes of
  inclusion in the analysis.

Lands with substantially noticeable management were identified by creating a map that depicts
past harvest and thinning from the FACTS and Legacy Harvest databases together with an
orthophoto of the project area. This information was viewed both in terms of type of
management and year of implementation. Where the orthophoto did not clearly indicate
substantially noticeable management (i.e. a uniform change in tree crown size and height, consistently open tree spacing, skid trails, etc.) stand conditions were verified on the ground. Administrative sites, and developed recreation sites were also included in lands with substantially noticeable management.

Wilderness, Inventoried Roadless Areas, Potential Wilderness Areas, development associated with roads, and lands with substantially noticeable management were then subtracted from the Sunrise planning area acres and the remaining acres are considered undeveloped lands. All polygons less than one acre were dropped from detailed study because individual polygons this small could easily result from mapping error and they are too small to be meaningful.

Indicators used for comparison purposes between alternatives are:

- Intrinsic physical and biological resources (soils, water, wildlife, recreation, fisheries, etc.)
- Intrinsic social values (apparent naturalness, solitude, remoteness)
- Change in acres of other undeveloped lands

**Affected Environment**

All roadless area acres were allocated to various management area strategies as disclosed in the Umatilla Forest Plan FEIS, Appendix C and described in the Record of Decision (page 6-9) 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 forgoing roadless character.

**The Asotin Creek IRA and PWA Description**: The Asotin Creek IRA (16,433 acres, which amounts to approximately 50 percent of the project area) and PWA (16,181 overlapping acres) includes the headwaters of the North Fork Asotin Creek. Almost the entire drainage is within the forest boundary. Bounded on the east by the Forest Boundary, this area may be accessed from numerous local roads emanating from Forest road 41 on the north side, Road 40 on the west side, and Road 44 on the south side. The trailhead for Trail 3125 is located five miles downstream on State lands.

**Existing and Desired Conditions**

Table 3-70 displays the acres of remaining other undeveloped lands within the Sunrise project area along with reference to maps found in Appendix A. The Sunrise planning area (approximately 33,500 acres) contains 4,527 acres identified as other undeveloped lands.

<table>
<thead>
<tr>
<th>Other Undeveloped Lands and Reference Map</th>
<th>Approximate Acres within Sunrise Analysis Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total acres considered within analysis area* (Map A-1).</td>
<td>33,150</td>
</tr>
<tr>
<td>Lands that are not National Forest within the analysis area (i.e. private lands)</td>
<td>1,130</td>
</tr>
<tr>
<td>Existing Wilderness</td>
<td>0</td>
</tr>
<tr>
<td>Existing Inventoried Roadless Areas (Asotin Creek IRA)**</td>
<td>16,433</td>
</tr>
<tr>
<td>Existing Potential Wilderness Areas**</td>
<td>16,181</td>
</tr>
<tr>
<td>Acres of substantially noticeable timber harvest activities excluded (Map A-2)</td>
<td>9,670</td>
</tr>
<tr>
<td>Acres of 'road improvements' excluded (roads maintained to level 1, 2, 3, 4, or 5)** (Map A-3).</td>
<td>7,681 (133 miles)</td>
</tr>
</tbody>
</table>
Evidence of activity would be apparent to varying degrees in treatment areas. The natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where tree cutting activities occur. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. Some stands would likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer.

The sense of remoteness, opportunities for solitude, and primitive recreation would be reduced as the sights and sounds of management would intrude into outer portions of the PWA. These effects would be confined to relatively small portions of the edges of the PWA. The vast majority of the PWA would retain the characteristics for which it was established.

Prescribed fire activities would result in short term effects including the sight and smell of smoke and the sight of burned vegetation. These effects are short term. In the long term, 10 years or longer, the prescribed burned areas would appear natural. Therefore, there would be no reduction in PWA due to prescribed fire activities.

The resulting effect for Alternative A would by about a 1% reduction to the PWA. Under Alternative B approximately 186 acres of the Asotin PWA would be affected by cutting and associated activities (such as new temporary road construction). Under Alternative C about 29 acres would be affected. Under Alternative C there would be less than a quarter of 1 percent reduction to the PWA. These acres would no longer meet PWA inventory criteria because timber harvest and creation of stumps would make them appear developed.

The vast majority of the PWA (99% or more) would remain intact. However, selection of either of the action alternatives could affect a future wilderness decision associated with a forest plan revision: the only difference between the alternatives would be the number of acres affected.

The table below is a summary of all the acres evaluated for lands with wilderness characteristics for this project. Information summarized in this table can be found in Appendix A. Table 3-71 displays the total lands considered Wilderness. Potential Wilderness Areas, Inventoried Roadless Areas, acres of undeveloped land and acres of developed landscape.

<table>
<thead>
<tr>
<th>Acres of Wilderness</th>
<th>Acres of Potential Wilderness Areas</th>
<th>Acres of Inventoried Roadless Areas</th>
<th>Acres of undeveloped lands</th>
<th>Acres of developed lands with substantially noticeable past harvest, roads, etc.</th>
<th>Non-federal land within Project Area (i.e. state and private land)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16,181</td>
<td>16,433</td>
<td>4,527</td>
<td>11,335*</td>
<td>1,130</td>
</tr>
</tbody>
</table>

*This includes all acres contained within the Sunrise planning area.
**The IRA and Potential Wilderness Area substantially overlap one another
***Some of these acres overlap with acres of substantially noticeable other improvements.
****This number does not include polygons less than one acre in size.
Undeveloped lands comprise approximately 14% of the Sunrise project planning area. Undeveloped lands within the project planning area are typically located in drainage bottoms and on steep slopes with timbered stringers and grassy ridgetops that are not timbered. The Asotin Creek IRA, PWA and undeveloped lands make up approximately 50 percent of the planning area.

The majority of the 4,527 acres of undeveloped lands within the project area are allocated to Forest Plan management areas C3-Big Game Winter Range, C4-Wildlife Habitat and C3A-Sensitive Big Game Winter Range. Any areas with unique ecological values within the Sunrise project area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations. Table 3-72 displays allocated acres by management area.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Acres of Other Undeveloped Lands located in each MA within the project area</th>
<th>Percent of Other Undeveloped Lands in each MA within the project area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4- Viewshed 2</td>
<td>109</td>
<td>2.4</td>
</tr>
<tr>
<td>A6- Developed Recreation</td>
<td>6</td>
<td>0.1</td>
</tr>
<tr>
<td>C1-Dedicated Old Growth</td>
<td>405</td>
<td>9</td>
</tr>
<tr>
<td>C3- Big Game Winter Range</td>
<td>519</td>
<td>11.5</td>
</tr>
<tr>
<td>C3A- Sensitive Big Game Winter Range</td>
<td>967</td>
<td>21.4</td>
</tr>
<tr>
<td>C4-Wildlife Habitat</td>
<td>2296</td>
<td>51</td>
</tr>
<tr>
<td>C5-Riparian (Fish and Wildlife)</td>
<td>198</td>
<td>4.4</td>
</tr>
<tr>
<td>C8-Grass Tree Mosaic</td>
<td>27</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>4,527</td>
<td>100%</td>
</tr>
</tbody>
</table>

More than 74 of the 83 Polygons of other undeveloped lands are from one to 100 acres in size (See Appendix A). These relatively smaller polygons make up about 22% of the undeveloped lands within the project area. They are typically very dissected and scattered throughout the project area. The two largest polygons, polygons 1 (1,303 acres) and polygon 2 (845 acres) make up about 47% of the undeveloped lands within the project area.

Polygon 1 is located in the lower portions of the upper reach of North Fork Asotin Creek and a tributary to NF Asotin creek-in Cougar Canyon. The polygon is mostly in the creeks bottoms and on timbered side slopes that have not been previously harvested. The creeks bottoms are in Management Area C-5-Riparian, and most of the rest of the polygon is in management area C-4-Wildlife habitat. Much of the polygon is part of a patchwork of past harvest areas.

Polygon 2 is located in the northeast portion of the project area mostly along Lick Creek and the Cabin Gulch tributary to Lick Creek. Most of the acres in polygon 2 are in management area C-9-Sensitive Big Game Winter Range. This polygon is typical of the lower, drier portions of the project area being comprised of grassy ridgetops and stringers of timber on steep side slopes.

Human influences have had limited impact to long-term ecological processes within the 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.
Soils in vegetated areas that have not been previously effected by activities described above are generally more productive and promote better vegetation growth than in other areas (see Soils Report, project file).

Most streams and aquatic habitat in the project area, including those that occur in other undeveloped lands, have been effected by past harvest, roads, etc., resulting in sedimentation, lack of large woody debris, and increased water temperature.

Plant communities, particularly habitat for threatened, endangered, and sensitive species, would be mostly unimpaired by human activities. Areas effected by past management activities and maintenance level 1 roads have altered plant communities progressing through various stages of succession. Noxious weeds have fewer transport venues in undeveloped areas and less opportunity to become established. However noxious weeds have many vectors, such as wind and wildlife, and infestations in remote areas not often visited likely go undetected and untreated.

Wildlife habitat on undeveloped lands varies widely in structure, composition, and density. These stands provide habitat for a wide range of wildlife species dependent on open canopy forest, closed canopy forest, grasslands, shrublands, early successional stages, dead wood, and other features. This variation in structure, composition, density, and other habitat features (including snags and downed wood) are the result of multiple factors including historic disturbance regimes, topographical features (aspect, slope position, moisture gradients, etc.), past management (harvest, fire suppression, etc), and other factors. Areas where there have been no timber management activities often provide snag densities that exceed those expected based on data from reference stands. Where no road building, past timber management, or natural disturbance events have occurred, snag and downed wood dynamics and stand structure, composition, and density (which contribute to habitat quality for a wide suite of wildlife species) are similar to what would have been expected historically and show no impairment by humans. Larger blocks of other undeveloped lands (areas 1,000 acres or more) would serve as movement corridors for many wildlife species. Where moisture and other factors allow, undeveloped lands and those areas where management activities are no longer noticeable (in terms of stand structure) provide higher quality and better distributed cover habitat for elk and dense dry upland forest stands for species like the pileated woodpecker.

Recreation in other developed lands within the project area provides recreation opportunities that are similar to those which occur throughout the rest of project area. Dispersed camping, hunting, horseback riding and hiking likely occur though there are few designated hiking trails. These activities occur within closer proximity to evidence of past harvest, roads, and other developed areas.

Opportunities for a feeling of remoteness are limited due to the small size, odd shapes and scattered distribution of most of the undeveloped polygons. Distance and topographic screening are also factors in creating such opportunities. Nearby, sights and sounds of roads and timber harvest can be heard and often seen from within undeveloped lands.

Visual quality within many other undeveloped lands would be high in the foreground, but views of managed landscapes could intrude within the smaller polygons, depending on the amount of screening provided by topography and tree cover.

No additional special or unique values in other undeveloped lands associated with the Sunrise analysis area have been identified by project resource specialists.
The existing condition of all remaining 11,335 acres of land within the Sunrise project area that are not IRAs, PWAs other undeveloped lands present a landscape that has been managed and is generally developed in nature. These lands contain evidence of past harvest and maintenance level 1 or higher forest roads. Past management actions and current conditions reflect the multiple-use intent and decisions made in the Forest Plan (1990 as amended), and reflects consistency with Forest Plan management area allocations.

Environmental Consequences

Direct and Indirect Effects

*Alternative A (No Action)*

There would be no direct or indirect effects to undeveloped lands because no activities would occur in these areas. The affected environment would remain unchanged, except by natural processes and ongoing management activities (see description of affected environment for a full list of resources considered). Biological and ecosystem functions would continue.

*Alternative B and C*

Table 3-73 displays the acres of treatment activities proposed within undeveloped lands by alternative and the amount of other undeveloped lands that would remain after implementation. Evidence of activity would be apparent to varying degrees in treatment areas. The natural appearance of the landscape would be reduced following treatment activities. Stumps, skid trails and slash would be evident where tree cutting activities occur. Tree density would be reduced which would result in more open stands compared with neighboring untreated areas. Some stands would likely be opened to the point that the skyline of the forest canopy appears highly manipulated to the casual observer. Overall, project activities would reduce undeveloped lands within the project area in Alternative B by 2,252 acres (50%) and 1,318 acres (29%) in Alternative C.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Acres of Other Undeveloped Lands in the Project Area Prior to Activity</th>
<th>Acres of Other Undeveloped Lands in the Project Area Affected (%)</th>
<th>Acres of Other Undeveloped Lands Remaining in the Project Area After Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative A</td>
<td>4,527</td>
<td>0 / (0%)</td>
<td>4,527</td>
</tr>
<tr>
<td>Alternative B</td>
<td>4,527</td>
<td>2,252/ (50%)</td>
<td>2,275</td>
</tr>
<tr>
<td>Alternative C</td>
<td>4,527</td>
<td>1,318 (29%)</td>
<td>3,209</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Acres of Potential Wilderness Area in the Project Area Prior to Activity</th>
<th>Acres of Potential Wilderness Area in the Project Area Affected (%)</th>
<th>Acres of Potential Wilderness Area Remaining in the Project Area After Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative A</td>
<td>16,181</td>
<td>0 / (0%)</td>
<td>16,181</td>
</tr>
<tr>
<td>Alternative B</td>
<td>16,181</td>
<td>186/ (1.1%)</td>
<td>15,995</td>
</tr>
<tr>
<td>Alternative C</td>
<td>16,181</td>
<td>29/ (0.2%)</td>
<td>16,152</td>
</tr>
</tbody>
</table>
Effects to the intrinsic physical and biological resources of other undeveloped lands within the Sunrise planning area (soils, water, wildlife, recreation, aquatic habitat, etc.) are disclosed in the applicable resource sections of the EIS and only briefly summarized here.

**Soils:** Where management would occur within other undeveloped lands, soils would be exposed to compaction and displacement from heavy equipment and erosion due to soil surface exposure during skidding or road construction/reconstruction. However, given the design criteria, a minimum of 80 percent of an activity area would remain in a condition of acceptable productivity potential consistent with Forest Plan standards.

**Water Quality:** The action alternatives have the potential to effect surface water quality and groundwater. However, the project contains site-specific Best Management Practices which are designed to prevent further impairment to water quality and to protect groundwater. These Best Management Practices would also prevent effects on fish. In addition, the potential for high intensity wildfire in the riparian areas would be reduced.

**Plant Communities:** Design criteria would protect threatened, endangered, or sensitive plants. Areas of disturbed soil would be open to colonization by noxious weeds.

**Wildlife habitat:** For Forest Plan indicator species such as elk, Alternative B and C, HEI would remain within forest plan standards. While forage may decrease due to prescribed burning activity in the short-term, activities such as burning and thinning are expected to improve forage in the long-term. There are many species, including primary and secondary cavity nesters, which rely on snags and dead and down for habitat. While both alternatives temporary effect the number and amount of snags and dead and down, Forest plan guidelines would be followed concerning the retention and recruitment of this habitat. The project area has documented instances of threatened, endangered, or sensitive (TES) species, as well as possible populations of TES species (see wildlife specialist report). For all documented and potential TES species, as well as other species of interest that are not TES, there is either a finding of no impact, or may impact but not likely cause a loss of viability of the species, for both alternatives. For all indicators, the No Action alternative is not expected to have any direct and indirect as well as cumulative effects. Current conditions are expected to persist outside the desired range.

**Recreation:** Recreation would change slightly, adding dispersed camping, motorized sports, and gathering forest products to the potential uses within other undeveloped lands. The quality of the hunting experience would be reduced if elk are displaced. Where treatment occurs within undeveloped lands, there would be a loss of apparent naturalness. Recreationists seeking a primitive experience or a sense of remoteness would have less area available due to harvest in the large polygons of other undeveloped lands whereas the small polygons have already been infringed upon by adjacent sights and sounds of management and human presence prior to implementation. The Asotin Creek IRA/PWA (16,000+ acres) comprises about 50% of the project area and would still provide opportunities for a primitive experience or a sense of remoteness and solitude. The 166,000 Wenaha-Tucannon Wilderness Area and the Wenatchee Creek and Upper Tucannon IRAs/PWAs are all located just outside the Sunrise project area. These areas provide outstanding opportunities for a primitive recreation experience and solitude.

On acres treated by commercial or noncommercial thinning, management activities would be substantially noticeable for up to 50 years, depending on the rate of stump decay and recovery of disturbed soils. Prescribed fire would have little effect on undeveloped lands characteristics in that the majority of the treated area would still appear natural, with some fire control lines and periodic stumps related to removal of hazardous snags. Pile burning would appear less natural, as...
blackened circles spaced somewhat regularly on the ground, but vegetation regrowth would begin to disguise this in one year, and by three years only burn scars on trees should be noticeable.

**Visual quality:** within undeveloped lands where management occurs would still meet Forest Plan standards, although views would no longer be pristine. There are several cultural resource sites within these other undeveloped lands, however no effects are expected on known cultural resources since all would be avoided by project activities. All of the proposed activities would not affect the historic integrity or historic character of these sites.

Environmental effects to resources in undeveloped lands due to the implementation of proposed project activities would be consistent with applicable laws, regulations, and Forest Plan management area standards and guidelines (see applicable sections of the EIS for Findings of Consistency for each resource).

All action alternatives propose some level of activity within undeveloped lands, varying only by the number of acres (see Table 3-73). Refer to the Appendix A and associated maps to see the location of activity units and other undeveloped lands and the EIS Chapter 2 for a listing of harvest activity units and logging method.

**Cumulative Effects**

*Alternative A (No Action)*

For the No Action alternative, the Sunrise project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action.

*Effects Common to All Action Alternatives—Alternatives B and C*

The cumulative effects geographic boundary is the Sunrise analysis area (33,150 acres). The types of direct and indirect effects expected to occur as a result of the Sunrise project are not expected to interact with any similar effects from past, present and reasonably foreseeable future actions that might occur elsewhere within the analysis area of the project area.

The temporal boundary for this cumulative effects analysis is 50 years. This timeframe is appropriate because that is how long it would take harvest and temporary road construction to no longer be substantially noticeable (based on field observations of other past management in the Sunrise analysis area).

Within the Sunrise project area, project related activities such as tree cutting, construction of temporary roads, re-opening of closed roads and prescribed burning would have an incremental effect on undeveloped lands where other past, present and ongoing activities such as grazing, dispersed camping, and vehicle use on roads also occur. Apparent naturalness, solitude and remoteness in these undeveloped lands within the project area would be reduced by noises and sounds from mechanized equipment, visibility of stumps or evidence of temporary roads, and smoke from prescribed burning. Those effects are expected to remain cumulatively minor due to their relatively short term (10 years) nature. Overall, cumulative effects from these activities on apparent naturalness, solitude and remoteness are very small (not measurable/indistinguishable from those effects described in direct and indirect effects).
Cumulative effects to soil, water quality, air quality; plant and animal communities; habitat for threatened, endangered, and sensitive species; recreation; noxious weeds; and cultural resources on undeveloped lands within the project area are disclosed in previous sections of this chapter and are not reiterated here.

Outside the treated areas, the conditions described in the affected environment would remain Visual Resource (Scenery)

Specific information on the methodologies, assumptions, and limitations of analysis and other scenery-related details are contained in the resource report contained in the project file. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

### 3.16 Recreation

This section incorporates by reference the Recreation Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Introduction**

The recreation opportunities available on National Forest lands broadly benefit users. For many Americans, public lands provide the only means of experiencing outdoor recreation. The settings and experiences of these lands are important to an overall healthy lifestyle of the American public. Managing recreation resources includes the analysis of projects in regard to how the activities will affect developed and undeveloped recreation sites, uses and activities, as well as recreation settings in which the user experience is presented.

**Regulatory Framework**

The Umatilla Forest Land and Resource Management Plan (LRMP) establishes goals related to specific resources by management area. The Forest Service issues a nationally recognized classification system called the Recreation Opportunity Spectrum (ROS) to describe different recreation settings, opportunities and experiences to help guide recreation management activities (USDA Forest Service 1986). The LRMP has recognized the importance of recreation settings. Each Management Area (MA) is assigned a desired ROS.

**Methodology**

ArcMap geographic information systems (GIS) was used to analyze the proposed activities in regards to recreation use and facilities, dispersed recreation sites and the recreation opportunity spectrum (ROS) classes assigned to the area.

Indicators for comparison purposes between alternatives are:

- Developed and Dispersed Camping: recreation experiences and availability
- Access and Dispersed Recreation Activities: travel access, safety, and desired use
• Recreation Opportunity Spectrum: level of development and settings: characteristics consistent with Recreation Niche Statement
• Sense of Place Characteristics consistent with Recreation Niche Statement (See Umatilla Forest Recreation Niche Statement in the Forest Plan)

Affected Environment

Existing Condition
The existing condition for recreation resources is considered in terms of facilities, travel and access, recreation opportunity spectrum and sense of place.

Developed and Dispersed Recreation

Developed Campgrounds:
There are no developed campgrounds located within the Sunrise project area. There are however two campgrounds located nearby.

Wickiup Campground is situated adjacent to the project area on FS road 43 near its junction with FS road 44 along the southeastern boundary. The campground is most heavily utilized during the late summer and fall hunting seasons.

Misery Campground is located just south of the southern boundary of the project area on FS road 4030020. Like Wickiup campground, it is most heavily utilized during the late summer and fall hunting seasons.

In addition to the two developed campgrounds, there are two other developed site: Misery Warming Shelter and Clearwater Big House Rental. While both of these are not within the project area, they are in proximity to roads that will be utilized by the Sunrise project. Misery Warming Shelter is utilized during the winter months, while Clearwater Big House Rental is available for rent year round.

Undeveloped Campsites:
There is no inventory of undeveloped campsites in the project area; however there are a number of traditional dispersed campsites scattered throughout. A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road.

Other popular recreation activities:
There are a number of popular recreation activities in the area besides camping that occur year around including:

• Hiking
• Horseback Riding
• All-Terrain Vehicle (ATV) Riding
• Mushroom and Berry Picking
• Hunting
• Sight Seeing
• Snowmobiling
Travel/Access

During the spring summer and fall months, there are 84 miles of roads that provide access for hiking, ATV riding, hunting, berry picking and sightseeing. Most routes are closed at different times of the year to certain types of vehicles for various reasons including for wildlife protection, improving big game hunting, facilitating winter recreation and erosion control. Portions of FS roads 40, 41, 42, 44 and their spurs are closed to motor vehicle travel except for snowmobiles travel from December 1st to April 1st. Between FS roads 40 and 44, there are approximately 15 miles of groomed snowmobile routes within the project area. Currently, there are a few miles of FS roads 41 and 4206 within the project area that remain open to the public year around.

Approximately 25 miles of motorized and non-motorized system trails (trails 3115, 3125, 3128, 3131, 3285 and 3286) are located within the project area, providing access to North Fork of Asotin Creek, Hard-To-Get-To Ridge and other more remote areas.

Recreation Opportunity Spectrum (ROS)

Currently the recreation opportunity is classified as shown in the table below. The classifications provide an understanding of the recreation setting in terms of access, remoteness, naturalness, facilities, social encounters, visitor impacts and visitor management.

<table>
<thead>
<tr>
<th>ROS Classification</th>
<th>Acres</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roaded Modified</td>
<td>16,553</td>
<td>50</td>
</tr>
<tr>
<td>Roaded Natural</td>
<td>9,656</td>
<td>29</td>
</tr>
<tr>
<td>Semi-Primitive Non-Motorized</td>
<td>5,789</td>
<td>17</td>
</tr>
<tr>
<td>Non-NFS Lands</td>
<td>1,152</td>
<td>4</td>
</tr>
<tr>
<td>Mapping Error</td>
<td>22</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>33,150</td>
<td>100</td>
</tr>
</tbody>
</table>

The area is divided into ROS classifications primarily by the available roads, facilities and expected social encounters. The semi-primitive Non-Motorized management area is located primarily within the heart of the Asotin Creek IRA/PWA. This area is very remote with trail access only. The roaded natural area is found within portions of the Asotin IRA/PWA, Lick Creek area and Bear Ridge-Spruce Springs areas. It’s also found around the Wickiup Campground, Misery Campground and Misery Warming Shelter areas. The roaded modified area captures the remaining acres that are roaded including the Clearwater Big House rental and hardy Ridge road complex.

Sense of Place

The sense of place that currently exists in this area is a remote working landscape. The area is utilized as a backcountry hunting/dispersed recreation experience.
Environmental Consequences

Direct and Indirect Effects

*Alternative A (No Action)*

The No Action alternative would perpetuate the existing management of the setting, facilities and access. Developed and dispersed site campers and cabin renters would remain undisturbed by noise, smoke, or traffic. Dispersed campsite use patterns would remain the same.

Travel and access would see no effects by the No Action alternative. The recreation opportunity spectrum would not be affected by the No Action alternative. The sense of place would see no effects by the No Action alternative.

For the No Action alternative, the Sunrise project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action alternative.

*Alternative B and C*

**Developed and Dispersed Recreation**

The campgrounds, rental cabin and some dispersed campsites would experience an increase in dust and noise during harvest and thinning activities, and by an increase of stand treatment related traffic on haul routes.

Effects to the recreation resources are primarily related to the harvest and prescribed fire activities and the disturbance that these activities create. These activities would create local, adverse, short term effects to the timbered portion of the landscape. For further description of these effects, see the scenery resource report.

Some recreationists could be displaced from their desired dispersed campsite, but again, the effects would be limited to a small number of sites at one time (local, adverse and short term) and would cease as soon as treatment of the adjacent unit is complete (generally 1-2 weeks as work is occurring). Hunters may be displaced from their favorite dispersed camping site for one season during the prescribed burning window. Numerous alternative dispersed campsites would continue to be available.

Wickiup Campground, Misery campground, Misery Warming Shelter and Clearwater Big House recreation rental cabin would remain available during and after stand treatments, but the campgrounds, rental cabin and disperse campsites could also be affected by smoke from prescribed burning. This could coincide with some of the more popular camping periods (fall hunting season) because conditions during late fall area generally the best times for conducting prescribed burning. Late fall campers (primarily hunters) would be most likely affected. Again, these effects are short term and local.

**Travel and Access**

Under Alternatives B and C many of the roads that are open for public travel would be utilized to access cutting units and to serve as haul routes. Some open roads or portions of open roads may be temporarily closed during project activities and would be re-opened as soon as possible after
work is completed, especially during hunting season. Open roads would generally be expected to remain open to the public during log haul.

There would be no changes to the existing travel system after treatment. Existing roads and trails that are open to the public would continue to be available. Increased vehicle traffic during harvest and thinning activities may deter localized recreational user activities.

Portions of some roads that are currently groomed during the winter for snowmobiles may be needed for winter haul. Under these circumstances a single lane would be plowed for log haul with grooming continuing to take place on the other side of the road or an alternative route would be groomed. This practice has been successful in a number other project areas in years past. While snowmobiling on groomed routes would continue to take place, the presence of a plowed route and truck traffic may negatively affect a visitor’s sense of remoteness.

**Trails:** Treatment activities would take place near or adjacent to many portions of the trail system. Harvest and thinning activities may deter localized recreational user activities. Under both action alternatives the trail system would continue to be available during and after treatment activities. There would be no changes to the trail system.

**Recreation Opportunity Spectrum**

The alternatives do not propose actions that would alter effects to the recreation opportunity spectrum. No camping facilities would be altered and the existing road and trail system would remain unchanged following project activities. Some undeveloped campsites may be altered by treatment but these changes would not alter the opportunities to a degree that would change the ROS classifications. Maps 12 and 13 show proposed cutting units by alternative in relation to ROS settings.

**Sense of Place**

The project is not expected to make any significant effects that are inconsistent with the Forest niche statement that describes the desired sense of place. The usage and settings are expected to remain consistent.

**Cumulative Effects**

*Alternative A (No Action)*

Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action alternative.

*Alternative B and C*

Considering past, present and foreseeable future actions, it is believed there would be no accumulative effects associated with recreation opportunities from either action alternatives.

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.
3.17 Air Quality

This section incorporates by reference the Air Quality Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

Introduction

The implementation of either action alternative has the potential to impact the health and safety of local residents and those utilizing public lands by increased smoke in the area. Either through inaction, Alternative A and the continued risk of large wildfires, or through prescribed fire, air quality was identified as a resource that should be analyzed for potential impacts.

Regulatory Framework

Currently, all prescribed burning that occurs on the Pomeroy Ranger District adheres to Washington State and Federal Air Quality Regulations (see Air Quality Report p. 2-5 for specific regulations). All prescribed burning is regulated by Washington State Department of Natural Resources (DNR) as defined by the Washington State Clean Air Act and is done in accordance with the Washington State DNR Smoke Management Plan.

Methodology

Prescribed burning must be, and is, approved on a day-by-day basis by the DNR smoke management meteorologist. By using current and predicted air quality conditions, current and forecasted weather conditions, knowledge of the local topography, wind patterns, and BlueSky Rains Smoke Dispersion modeling the DNR meteorologist determines if prescribed burning projects would meet State smoke management guidelines on any given day. Pomeroy Ranger District personnel also monitor for effects from smoke produced, and if negative effects occur they notify DNR and discontinue ignition.

Outdoor air quality in Washington is influenced predominately by smoke from agricultural and outdoor burning, woodstoves and motor vehicles (EPA, 2011). It is monitored utilizing Air Quality Index (AQI) levels. The higher the AQI, the greater the level of air pollution and the higher the health concerns (see Air Quality report). Wildfires are not considered as a cause for violations of air quality standards or visibility protection goals because they are consider natural events, but prescribed fires are considered active management so the smoke produced is considered as an impact on air quality and visibility standards.

The below cited references are from “Smoke Management Guide for Prescribed and Wildland Fire” published by the National Wildfire Coordination Group. This Forest Service publication is comprised of multiple papers that serve as a handbook for smoke management.

A prescribed fire is a combustion process that has no pollution control devices to remove pollutants (Achtemeier 2001). CO₂ and water (H₂O) make up 90 percent of total emissions from wildfire and prescribed fire (Ottmar and Reinhardt 2001). The other 10 percent is made up of CO, hydrocarbons (HC), nitrogen oxides (NOₓ), which includes NO₂ and PM (PM₂.5 and PM₁₀) (Ottmar and Reinhardt 2010). CO and PM are the chief inhalation hazards to the public and fireline personnel when exposed to smoke (Ottmar and Reinhardt). Over 90 percent of particulate matter produced by wildland fires is less than 10 microns in diameter and over 80-90 percent of this is less than 2.5 microns in diameter (Ottmar 2001). Particles less than 2.5
micrometers in diameter (PM$_{2.5}$) are referred to as "fine" particles and are believed to pose the largest health risks.

Smoke intrusions and visibility reduction may also result from the direct impact of the smoke plume. Intrusions of smoke can cause numerous nuisance impacts, as well as specific safety hazards. The vast majority of prescribed burns occur without negative smoke impacts (Achtemeier 2001). Prescribed fires produce smoke, but less smoke is generated for the same acre than for a wildfire. Prescribed fire smoke, unlike wildfire smoke is regulated. Table 3-76 estimates smoke emissions for PM$_{2.5}$ and CO during prescribed fire and wildfire in dry, moist and cold forest types and grass/shrub fuel types. These fuel types are all common in the Sunrise planning area. The table below is to show that smoke emissions from wildfire exceed smoke emissions from prescribed fire.

<table>
<thead>
<tr>
<th>Forest Type</th>
<th>Smoke Emission Type</th>
<th>Wildfire</th>
<th>Prescribed Fire$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Forest (Interior Ponderosa Pine)</td>
<td>PM 2.5</td>
<td>327</td>
<td>296</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>3969</td>
<td>3551</td>
</tr>
<tr>
<td>Moist Forest (Interior Douglas Fir)</td>
<td>PM 2.5</td>
<td>581</td>
<td>524</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>7391</td>
<td>6592</td>
</tr>
<tr>
<td>Cold Forest (Engelmann Spruce – Subalpine fir)</td>
<td>PM 2.5</td>
<td>1816</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>23795</td>
<td>N/A</td>
</tr>
<tr>
<td>Grass/Shrub (Idaho Fescue)</td>
<td>PM 2.5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>CO</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

$^1$ Any prescribed fire in cold forest type would be incidental and would only be included to provide secure holding locations.

Table 3-77. Estimated PM2.5 and CO emissions by burn type in the Sunrise Planning area (acres)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Activity Fuels Burning</th>
<th>Natural (Landscape) Fuels Burning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$PM_{2.5} = 1699\text{lbs/ac}$</td>
<td>$PM_{2.5} = 1295\text{lbs/ac}$</td>
</tr>
<tr>
<td></td>
<td>$CO = 21146\text{lbs/ac}$</td>
<td>$CO = 16,787\text{lbs/ac}$</td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>878</td>
<td>14,055</td>
</tr>
<tr>
<td>C</td>
<td>599</td>
<td>14,055</td>
</tr>
</tbody>
</table>

Affected Environment

The analysis area for air quality impacts includes Class I areas, “designated” or nonattainment areas, and sensitive areas that may likely be affected by smoke intrusion from prescribed burning activities in the sunrise planning area. These areas may include:

- Class I Federal area, Hells Canyon Wilderness, approximately 55 air miles to the southeast of the project area.
- Class I Federal area, Eagle Cap Wilderness, approximately 50 air miles to the south of the project area.
- Sensitive areas, Clarkston, Washington (approximate population 19,866) and Lewiston, Idaho (approximate population 32,544) being the largest population centers located 15 air miles to the northeast of the project area.
- Sensitive area, Asotin, Washington (approximate population 1251) is located four air miles to the west of the project area.
- Sensitive area, Wenaha-Tucannon Wilderness which is located two air miles to the southwest
Environmental Consequences

Direct and Indirect Effects

**Alternative A (No Action)**

This alternative would have no immediate direct, short or long term adverse effect on local air quality as no action would be taken. The No Action alternative would mean only burn prescriptions already approved, and outside the project area, would commence.

While there should be no direct effects from the No Action alternative, indirect consequences would include wildfires that typically burn with a higher intensity and burn more acres creating emissions that are higher than that of prescribed fire. Consumption is also higher during wildfires than prescribed fires contributing to the greater production of emissions. Wildfires may also occur under weather conditions which limit smoke dispersal.

Smoke concentrations can increase during the night due to inversions, but may decrease during the afternoons due to dispersion. Wildfire smoke may last for several weeks depending on fire behavior and meteorology.

In 2000, wildfire smoke concentrations in Montana were many times higher than monitored previously. PM$_{2.5}$ concentrations ranged between 100 and 600 µg/m$^3$ (24-hour average) up to 100 miles from the fire.

There is a potential for indirect adverse short term local effects to air quality if due to a lack of fuels management, wildfires are able to grow in intensity.

**Alternatives B and C**

The Sunrise project proposes to treat approximately 14,055 of landscape prescribed fire (natural fuels) in both alternatives, and approximately 878 acres of activity fuels burning in Alternative B and 599 in Alternative C. Estimated amount of smoke emissions produced during prescribed burning is depicted in Table 3-77. Prescribed fire treatments and the associated smoke emissions in the Sunrise project area would occur over an extended period of time. PM$_{2.5}$ and CO produced would vary by size and environmental conditions at the time of implementation. For example, a 30 acre activity fuels burn would produce approximately 30,600 pounds of PM$_{2.5}$ and 378,720 pounds of CO emissions. This would occur primarily during the day of ignition, becoming significantly less each day until the burn is out. Therefore, for both action alternatives there would be a short term, adverse direct impact in the form of smoke exposure in the project area.

Current fuel load estimates in proposed timber sale units are 7 to 30 tons per acre. Predicted fuel loads after timber harvest is estimated to be 25 to 65 tons per acre. The estimated amount of fuel consumed during prescribed burning in activity units would average about 15 to 39 tons per acre. Estimated fuel loads in natural fuels units is .95 to 29 tons per acre. Estimated amount consumed during burning would average 0.75 to 17.4 tons per acre. The fuel component consumed in all
activities includes litter, woody material, duff, herbaceous material, shrubs, crown foliage, and crown branchwood.\(^{27}\)

The indirect effects of the action alternatives would be adverse, short term smoke exposure to the local area. There is however, the potential for the long term beneficial effect of less smoke exposure in the local area from a reduction in fuel and a lessening of potential wildfire severity form the action alternatives.

**Mitigation Measures**

Prescribed burning must be, and is, approved on a day-by-day basis by the DNR smoke management meteorologist. By using current and predicted air quality conditions, current and forecasted weather conditions, knowledge of the local topography, wind patterns, and BlueSky Rains Smoke Dispersion modeling the DNR meteorologist determines if prescribed burning projects would meet State smoke management guidelines on any given day.

**Cumulative Effects**

*Alternative A*

Activities considered for cumulative effects are those that further modify indicators used in this analysis. The indicators utilized to measure changes in conditions for this analysis are pounds of PM2.5 and CO. Past actions were considered and addressed in the current conditions section of this document. For an activity to be considered as contributing to cumulative effects, the effects of that action must overlap in space and time with the prescribed burning proposed under one of the action alternatives in this analysis.

Prescribed burning (silvicultural burning) by the US Forest Service in Washington State must be approved by a Washington State Department of Natural Resource smoke management meteorologist (if smoke produced exceeds 100 tons) on each day of a planned ignition. This approval process sets priorities within the State and between competing airsheds to minimize smoke impacts on Federal class I areas, non-attainment areas and sensitive areas. Therefore, prescribed burning would not likely be approved if smoke produced from silvicultural burning would cause the NAAQS to be exceeded.

Because no direct or indirect effects would occur with implementing Alternative A, there are no cumulative effects.

There would continue to be wildfires in the project area. Smoke from wildfire is not considered as a cause for violations of air quality standards or visibility protection goals because they are considered natural events; however, effects of smoke from a large wildfire could influence AQI.

*Alternatives B and C*

Smoke from prescribed burning is short term; therefore, effects of the proposed action from smoke emissions are not likely to have cumulative effects with other activities. The Washington DNR Smoke Management Plan permits burning only when atmospheric stability allows for good smoke dispersion. They also regulate the daily amount of burning to reduce impacts and negative effects of smoke. Prescribed burning competes with other burning in the airshed. The

\(^{27}\) Fuel loadings and particulate emissions were estimated using FOFEM version 6.3.1.
Washington DNR is responsible for managing all burn activities on a given day. The Forest Service is responsible for establishing burn priorities for its actions. If air quality is predicted to exceed thresholds when proposed activities are scheduled to occur, implementing any of these alternatives may result in some delays in burning as a result of this increased demand for “air space.”

**Irreversible and Irretrievable Commitment of Resources**

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

### 3.18 Range

This section incorporates field data and other files and documents gathered by the Range Specialist of the Pomeroy Ranger District. These documents are available in the project analysis file at Pomeroy Ranger District office. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the project file. A summary of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

**Introduction**

Gazing and grazing permitting continues to be an important aspect of management of the Umatilla National Forest, and is therefore a resource of interest for analysis. The effects of grazing itself on the project area, as well as the effects to grazing quality and availability are analyzed in this section.

**Regulatory Framework**

This document incorporates the requirements and guidelines as set forth in the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Umatilla National Forest Land and Resource Management Plan (LRMP) which was signed March 8, 1991 as amended by the continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (hereafter referred to as “eastside screens”, (Lowe, 1995)). The Interim Strategies For Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), which was signed February 24, 1995.

**Methodology**

The main concern associated with range and grazing are the effects of livestock on the ecosystem. Livestock can contribute to soil compaction, water quality issues, or erosion and streambank stability issues. These concerns are addressed through monitoring. There are three monitoring locations within the project area. Monitoring is done through the PACFISH/INFISH Biological Opinion monitoring program (PIBO) and includes brush and stubble height measurements, streambank stability analysis, recording disturbances, and measuring coarse woody debris availability.

**Scale of Analysis**

The Sunrise Vegetation and Fuels Management project planning area is located within portions of the Asotin and Peola C&H grazing allotments. For the purpose of discussing domestic livestock grazing, those portions of the above listed allotments that are within the project
planning area will be analyzed, while the portions of the allotments that are outside the analysis area will not be discussed in detail.

The indicator for comparison purposes between alternatives are environmental effects of this project from livestock grazing. They will be discussed in relation to how each alternative affects management of livestock distributions in uplands and riparian community types.

**Affected Environment**

Asotin allotment is located in the eastern portion of Pomeroy Ranger District, mainly in the Asotin Watershed, about twelve miles west of Anatone, Washington. The entire area of the allotment encompasses approximately 39,400 total acres, but only 1,772 acres are in the planning area. The Asotin C&H Allotment currently permits approximately 2,204 AUMs (Animal Unit Months). The allotment is a cattle (cow/calf) permit for a total of 413 pair from June 13th to October 13th annually. There is one permit holder and approximately 4 water developments and 1 wildlife guzzler within the project area.

Asotin C&H Allotment is divided into four pastures: Park/Cook, Hogback, George and Wenatchee. The Park/Cook and Hogback pastures are the only two pastures that lie within the project area.

The Peola C&H Allotment currently permits approximately 1,948 AUMs (Animal Unit Months). The allotment is cattle (cow/calf) permit for a total of 333 pair from June 3rd to October 7th and 22 pair from June 15th to October 15th annually. There are two permit holders and approximately 13 miles of fence, 41 water developments (consisting of troughs and ponds combined) and 4 wildlife guzzlers within the project area.

Peola C&H Allotment is divided into eleven pastures: Cottonwood, Dick, Dick Trail, Lower Sourdough, Upper Sourdough, North Fork, Lick, Charley, Abels, Lower Pataha and Upper Pataha pastures. The Project area lie within the North Fork, Lower Sourdough, Upper Sourdough, Lick and Charley pastures, but only Lick and Charley pastures are currently in use.

**Environmental Consequences**

**Direct Effects and Indirect Effects**

*Alternative A (No Action)*

Livestock grazing distribution would likely stay the same or continue to slowly decrease as stocking in timber stands grows denser and wood continues to accumulate on the ground. Livestock access would stay the same or continue to slowly decrease due to down wood, continuous regeneration of trees, and the resulting reduction in visibility. Forage would also stay the same or continue to slowly decrease due to the gradual reduction of sunlight on the forest floor reducing forest floor vegetation.

In the context of NEPA, 40CFR 1508.8 states that effects arise from taking an action, and therefore with the No Action alternative there would be no direct or indirect effects.

*Alternatives B and C*

Both action alternatives would increase livestock distribution on the Asotin C&H Allotment by increasing access and or increasing available forage for livestock. This would have a short term local beneficial effect to available livestock forage by spreading utilization of vegetation more
evenly through the allotment and reduce soil and vegetation disturbance in areas of concentrated use.

Proposed burning would reduce the amount of forage in a one to two-year period, however, after that time period forage would be expected to be higher than the existing condition due to the reduction in competition from small trees and or shrubs, and would therefore have a short term local beneficial effect.

Proposed non-commercial thinning, commercial thinning, removal of danger trees, fuels reduction projects, and harvest would increase the amount of sunlight on the forest floor, stimulating grass growth and increasing the amount of available forage (transitory range\textsuperscript{28}) for domestic livestock and would therefore have a short term local beneficial effect.

Management of livestock would improve with all action alternatives due to increased visibility and access for livestock herding, and due to short term local beneficial increases in forage. An increase in distribution of livestock could decrease the amount of use on riparian areas. The effects of the approximately 240 acres of proposed riparian fuels treatment in the RHCA may result in cattle drawn into the new established forage near water. These areas would be monitored to minimize negative effects from this activity.

Cumulative Effects

\textit{Alternative A (No Action)}

For the No Action alternative, the Sunrise project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action.

\textit{Alternatives B and C}

Proposed treatments in all action alternatives, non-commercial thinning and landscape prescribed burns, could result in long-term benefits to forage and increased accessibility for livestock. But these benefits must be maintained through continued prescribed burns and burning activities. Analysis area for cumulative effects is the project planning area and the time period is approximately five years, as this is the duration of current grazing permits.

\textit{Irreversible and Irretrievable Commitment of Resources}

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

\textbf{3.19 Economic Analysis}

This section incorporates by reference the Economic Analysis Report contained in the project analysis file at Pomeroy Ranger District. Specific information on the methodologies, assumptions, and limitations of analysis and other details are contained in the report. A summary

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\textsuperscript{28} Transitory Range –Land that is suitable for grazing use of a non-enduring nature over a period of time; often found in the openings create d timber harvesting activities.
of the current conditions of the affected environment and the predicted effects of the Proposed Action and its alternatives are discussed in this section.

Introduction
The management of the Umatilla National Forest has the potential to affect local economies. This section presents the economic effects of the project, including the project feasibility, financial efficiency, and effects to jobs and income. Economics was identified as a component of the purpose and need of the Sunrise project. Specifically, a need was identified to contribute wood products to local and regional economies. This analysis discusses the revenues and costs of the commercial, non-commercial, and restoration activities proposed in the Sunrise alternatives.

Regulatory Framework
This document incorporates the requirements and guidelines as set forth in the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the Umatilla National Forest Land and Resource Management Plan (LRMP) which was signed March 8, 1991, as amended by the continuation of Interim Management Direction Establishing Riparian, Ecosystem, and Wildlife Standards for Timber Sales (hereafter referred to as “eastside screens”, (Lowe, 1995)). The Interim Strategies For Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), which was signed February 24, 1995.

Section 16 USC 1604(g)(3)(E)(iv) requires that timber will be harvested from National Forest lands only where the harvest system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber. Executive Order 12898, issued in 1994 orders Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife.

The geographic scope of the economic analysis includes Columbia, Asotin and Garfield Counties, Washington, and Nez Perce County, Idaho. Nez Perce County is included in the analysis as most of the wood products production would take there, and should be included in the effects on local economies. The economic effects of the project is expected to occur over the next 10 years, establishing the temporal scale for the project. Indicators for Comparison purposes between alternatives are:

- Alternative efficiency –net present value (NPV)
- Sale Viability –volume (MBF), stumpage, and costs
- Benefits to regional economy –number of jobs, personal income

Affected Environment
Forest products have been an economic mainstay for over a century in the Sunrise project area. Over the last 15 to 20 years, the supply of timber products from the Agency to the local communities has been greatly reduced.

Existing Conditions
Total Volume

According to the Washington Department of Natural Resources and US Forest Service Sale Detail Reports (2006-2015), timber harvest across the three Washington counties averaged 26.2
MBBF per year from 2006 to 2015 with 13.2 MMBF (50.3%) of that from Forest Service lands. At the peak in 2006, the counties supported a 101.9 MMBF timber harvest, 40.4 MMBF from Forest Service lands. The low in timber harvest occurred in 2012 with 4.8 MMBF harvested, 4.7 MMBF Forest Service lands.

**Harvest Cost, Harvest Revenue, and Stumpage**

Average log prices have rebounded significantly from 2008-2009 recession values. According to Oregon Department of Forestry data, the average log price for Douglas-fir has increased 208% from a low in the second quarter of 2009 until the fourth quarter of 2015. This increase allows for greater stumpage values (stumpage value is the logging/hauling costs subtracted from the delivered log price), an improved forest-sector economy, and a greater likelihood of timber sales being economically feasible, financially efficient, and salable to local purchasers.

**Additional Activity Cost**

The existing conditions and need for action relevant to each of the additional project activities is addressed in the specialist report for the related resource. See the specialist report associated with each additional project activity for more information. See the economic specialist report for existing conditions related to non-timber production activities.

**Net Present Value**

Net Present Value was estimated using the Region 6 approved R6_TEAEcon program. Values were estimated using a 2% discount rate with harvest activities occurring over 5 years starting one year from now. Other associated activities would begin in the following year, and occur over a five year span.

**Effect on Local Economies**

According to Headwaters Economics the current employment for the four counties was estimated at 1,751 jobs with an average salary of $43,177 for the natural resources sector (headwaters.org).

For a breakdown of proposed treatments and activities for each alternative see Table 2-3.

**Environmental Consequences**

**Direct and Indirect Effects**

**Alternative A (No Action)**

Under the No Action alternative, no commercial timber harvest, pre-commercial thinning, or fuel reduction activities associated with the Sunrise project would occur. Except for the Agency’s planning costs, Alternative A would incur no costs, produce no revenue, and would not change the conditions or level of economic activity in the surrounding counties. This alternative may, however, contribute to a decline in the local timber industry and local economy, since it would keep federal timber from the market. Additionally, since Alternative A would allow further departure from historic conditions in the Sunrise area, it is possible that costs could be incurred in the future to remediate issues such as insects, disease, and wildfires that could have been less costly if an action alternative had been chosen.
**Alternative B**

**Alternative Efficiency and Sale Viability (Direct and Indirect Effects)**

The total volume from this alternative is expected to be 25.6 MMBF of which 80% would likely be saw log based on past experience from similar stands.

**Harvest Costs**

Logging systems proposed for Alternative B of the Sunrise Project include ground-based and skyline. Approximately 60% of proposed harvest acres would be yarded with a ground-based system; and 40% yarded with a skyline system.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Stump to Truck ($/MBF)</th>
<th>Hauling ($/MBF)</th>
<th>BD/Temp Roads/EC ($/MBF)</th>
<th>Total ($/MBF)</th>
<th>Volume/Acre (MBF)</th>
<th>Total ($/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$140</td>
<td>$68</td>
<td>$14</td>
<td>$222</td>
<td>4.2</td>
<td>$932</td>
</tr>
<tr>
<td>Skyline</td>
<td>$250</td>
<td>$68</td>
<td>$19</td>
<td>$337</td>
<td>5.4</td>
<td>$1,820</td>
</tr>
</tbody>
</table>

Logging costs were developed using LOGCOST version 15.0 and the hauling costs were developed using Haul Cost Appraisal version 15.0. Other cost were developed using nearby sales.

**Gross Revenue**

Gross revenue is the price offered for delivered logs from area mills. Listed values reflect prices as of February, 2017. See Table 3-79 for projected gross revenue for ground-based and skyline units.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Average Product Value ($/MBF)</th>
<th>Volume/Acre</th>
<th>Product Value ($/Acre)</th>
<th>Net Acres</th>
<th>Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$343</td>
<td>4.2</td>
<td>$1,441</td>
<td>3320</td>
<td>$4,784,120</td>
</tr>
<tr>
<td>Skyline</td>
<td>$382*</td>
<td>5.4</td>
<td>$2,063</td>
<td>2210</td>
<td>$4,559,230</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>5,530</td>
<td>$9,343,350</td>
</tr>
</tbody>
</table>

*Higher stumpage results from no removal of green bio convertible*

**Stumpage Value**

Stumpage value is the logging/hauling costs subtracted from the delivered log price. See the Table 3-80 for projected stumpage values for ground-based and skyline units.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Product Value ($/Acre)</th>
<th>Harvest Costs ($/Acre)</th>
<th>Stumpage Value ($/Acre)</th>
<th>Volume/Acre (MBF)</th>
<th>Stumpage Value ($/MBF)</th>
<th>Net Acres</th>
<th>Total Stumpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$1,441</td>
<td>(-$932)</td>
<td>$509</td>
<td>4.2</td>
<td>$121</td>
<td>3,320</td>
<td>$1,689,880</td>
</tr>
<tr>
<td>Skyline</td>
<td>$2,063</td>
<td>(-$1,820)</td>
<td>$243</td>
<td>5.4</td>
<td>$47</td>
<td>2,210</td>
<td>$537,030</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5530</td>
<td>$2,226,910</td>
</tr>
</tbody>
</table>
**Additional Activities**

The total cost of implementing the Sunrise project are $3.1 million. Costs were obtained from each specialist and are shown in Table 3-81.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Acres</th>
<th>Cost/Acre</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber Marking</td>
<td>5,530</td>
<td>$70</td>
<td>$387,100</td>
</tr>
<tr>
<td>Reforestation</td>
<td>2,130</td>
<td>$725</td>
<td>$1,544,250</td>
</tr>
<tr>
<td>Non-Commercial Thinning</td>
<td>2,270</td>
<td>$325</td>
<td>$737,750</td>
</tr>
<tr>
<td>Landscape Burning</td>
<td>14,055</td>
<td>15</td>
<td>$210,825</td>
</tr>
<tr>
<td>Grapple Piling and Burning of Activity Fuels</td>
<td>1,068</td>
<td>140</td>
<td>$149,520</td>
</tr>
<tr>
<td>Prescribed burning of Activity Fuels</td>
<td>877</td>
<td>120</td>
<td>$105,240</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$3,134,685</strong></td>
</tr>
</tbody>
</table>

**Net Present Value**

Present value for the stumpage and additional costs for this alternative were $2.09 million and $2.89 million for a net present value of negative (-) $800,000.

**Regional Economies**

At the volume estimated and approximately 8.85 jobs created per million board feet the estimate for this alternative would produce 234 jobs for a gross income of $10.1 million in salary over the life of the project.

There is the potential for a direct localized, short-term benefit to the local economy from implementation of alternative B. Indirect effects are more qualitative in nature and related to the effects of those dollars on the local economy.

**Mitigation Measures**

Mitigation measures do not apply to this resource.

**Alternative C**

**Alternative Efficiency and Sale Viability (Direct and Indirect Effects)**

The total volume from this alternative is expected to be 12.1 MMBF of which 80% would likely be saw log based on past experience from similar stands.

**Harvest Costs**

Logging systems proposed for Alternative B of the Sunrise Project include ground-based and skyline. Approximately 60% of proposed harvest acres would be yarded with a ground-based system; and 40% yarded with a skyline system.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Stump to Truck ($/MBF)</th>
<th>Hauling ($/MBF)</th>
<th>BD/Temp Roads/EC ($/MBF)</th>
<th>Total ($/MBF)</th>
<th>Volume/Acre (MBF)</th>
<th>Total ($/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$143</td>
<td>$68</td>
<td>$14</td>
<td>$225</td>
<td>4.0</td>
<td>$904</td>
</tr>
<tr>
<td>Skyline</td>
<td>$229</td>
<td>$68</td>
<td>$19</td>
<td>$316</td>
<td>6.0</td>
<td>$1,905</td>
</tr>
</tbody>
</table>
Logging costs were developed using LOGCOST version 15.0 and the hauling costs were developed using HaulCost Appraisal version 15.0. Other cost were developed using nearby sales.

**Gross Revenue**

Gross revenue is the price offered for delivered logs from area mills. Listed values reflect prices as of February, 2017. See the table below for projected gross revenue for ground-based and skyline units.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Average Product Value ($/MBF)</th>
<th>Volume/Acre</th>
<th>Product Value ($/Acre)</th>
<th>Net Acres</th>
<th>Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$343</td>
<td>4.0</td>
<td>$1,372</td>
<td>1,650</td>
<td>$2,263,800</td>
</tr>
<tr>
<td>Skyline</td>
<td>$382*</td>
<td>6.0</td>
<td>$2,292</td>
<td>910</td>
<td>$2,085,720</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>2,560</td>
<td>$4,349,520</td>
</tr>
</tbody>
</table>

*Higher stumpage results from no removal of green bio convertible

**Stumpage Value**

Stumpage value is the logging/hauling costs subtracted from the delivered log price. See Table 3-84 for projected stumpage values for ground-based and skyline units.

<table>
<thead>
<tr>
<th>Logging System</th>
<th>Product Value ($/Acre)</th>
<th>Harvest Costs ($/Acre)</th>
<th>Stumpage Value ($/Acre)</th>
<th>Volume/Acre (MBF)</th>
<th>Stumpage Value ($/MBF)</th>
<th>Net Acres</th>
<th>Total Stumpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground-based</td>
<td>$1,372</td>
<td>(-$904)</td>
<td>$468</td>
<td>4</td>
<td>$117</td>
<td>1,650</td>
<td>$772,200</td>
</tr>
<tr>
<td>Skyline</td>
<td>$2,292</td>
<td>(-$1,905)</td>
<td>$387</td>
<td>6</td>
<td>$65</td>
<td>910</td>
<td>$352,170</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2560</td>
<td>$1,124,370</td>
</tr>
</tbody>
</table>

**Benefits**

The total cost of implementing Alternative C of the Sunrise project is $1.9 million. Costs were obtained from each specialist and are shown in Table 3-85.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Acres</th>
<th>Cost/Acre</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber Marking</td>
<td>2,560</td>
<td>70</td>
<td>$179,200</td>
</tr>
<tr>
<td>Reforestation</td>
<td>940</td>
<td>725</td>
<td>$681,500</td>
</tr>
<tr>
<td>Non-Commercial Thinning</td>
<td>2,270</td>
<td>325</td>
<td>$737,750</td>
</tr>
<tr>
<td>Landscape Burning</td>
<td>14,055</td>
<td>15</td>
<td>$210,825</td>
</tr>
<tr>
<td>Grapple Piling and Burning of Activity Fuels</td>
<td>329</td>
<td>140</td>
<td>$46,060</td>
</tr>
<tr>
<td>Prescribed burning of Activity Fuels</td>
<td>599</td>
<td>120</td>
<td>$71,880</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$1,927,215</strong></td>
</tr>
</tbody>
</table>
Net Present Value

Present value for the stumpage and additional costs for this alternative were $1.06 million and $1.78 million for a net present value of $720,000.

Regional Economies

At the volume estimated and approximately 8.85 jobs created per million board feet the estimate for this alternative would produce 107 jobs for a gross income of $4.6 million in salary over the life of the project.

Cumulative Effects

Alternative A (No Action)

For the No Action alternative, the Sunrise project would not be authorizing any actions; therefore it would not be adding anything to the effects of past, present, and reasonably foreseeable future actions. Based on the definition provided in the CEQ regulations (p. 3-1), there would be no cumulative effects for the No Action.

Alternatives B and C

Many factors influence and affect the local economies, including changes to industry technologies, economic growth, international trade, and the economic diversity and dependency of the counties. This project in connection with other projects is not likely to add to any short term (either beneficial or adverse) effects to local economies. However, the jobs and income associated with the action alternatives may bring the local economy some increased relative stability during the life of the project.

Irreversible and Irretrievable Commitment of Resources

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.20 Climate Change

All analyzed alternatives could affect up to approximately 7,800 acres of forest by commercially thinning smaller trees from the stand, and prescribed fires associated with the Sunrise and Asotin burn decision could affect up to 21,800 of forest and grassland. Although such activities are noticeable at the watershed scale, this scope would be minor relative to the amount of forested land in the states of Oregon and Washington as a whole. Climate change is a global phenomenon because major greenhouse gasses (GHG) mix well throughout the planet’s lower atmosphere (IPCC 2013). Considering emissions of GHG in 2010 was estimated at 49 ± 4.5 gigatonnes29 globally (IPCC 2014) and 6.9 gigatonnes nationally (US EPA, 2015), a project of this magnitude makes an infinitesimal contribution to overall emissions. Therefore, at the global and national scales, this proposed action’s direct and indirect contribution to greenhouse gasses and climate change would be negligible.

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29 A gigatonne is one billion metric tons of CO2; equal to about 2.2 trillion pounds.
In addition, because the direct and indirect effects would be negligible, the proposed action’s contribution to cumulative effects on global greenhouse gasses and climate change would also be negligible.

The Intergovernmental Panel on Climate Change has summarized the contributions to climate change of global human activity sectors in its Fifth Assessment Report (IPCC 2014). In 2010, anthropogenic (human-caused) contributors to greenhouse gas emissions came from several sectors:

- Industry, transportation, and building – 41%
- Energy production – 35%
- Agriculture – 12%
- Forestry and other land uses – 12%

There is agreement that the forestry sector contribution has declined over the last decade (IPCC, 2014; Smith et al., 2014; FAOSTAT, 2013). The main activity in this sector associated with GHG emissions is deforestation, which is defined as removal of all trees, most notably the conversion of forest and grassland into agricultural land or developed landscapes (IPCC 2000).

The Sunrise project does not fall within any of these main contributors of greenhouse gas emissions. Forested land would not be converted into a developed or agricultural condition. In fact, forest stands are being retained and thinned to maintain a vigorous condition that supports trees, and sequesters carbon long-term. US forests sequestered 757.1 megatonnes\(^{30}\) of carbon dioxide after accounting for emissions from fires and soils in 2010 (US EPA, 2015). However there is growing concern over the impacts of climate change on US forests and their current status as a carbon sink. There is strong evidence of a relationship between increasing temperatures and large tree mortality events in forests of the western US. There is widespread recognition that climate change is increasing the size and frequency of droughts, fires, and insect/disease outbreaks, which would have major effect on these forests’ role in the carbon cycle (Joyce et al. 2014).

The project is in line with the suggested practice of reducing forest disturbance effects found in the National Climate Assessment for public and private forests (Joyce et al. 2014). Here specifically, the project proposes to modify stand density, species composition, structural stage, and/or fuel loading. This project falls within the types of options presented by the IPCC for minimizing the impacts of climate change on forest carbon, and represents a potential synergy between adaptation measures and mitigation. Actions aimed at enhancing forest resilience to climate change by reducing the potential for large-scale, catastrophic disturbances such as wildfire of high intensity and resulting in permanent losses of productivity also prevents release of GHG and enhances carbon stocks (Smith et al. 2014). As described in the direct and indirect sections above, the proposed action reflects the rationale behind these recommendations because it would increase the extent of stand densities, species compositions, and stand structures more resistant to insect, disease, and wildfire disturbances.

Timber management projects can influence carbon dioxide sequestration in four main ways: (1) by increasing new forests (afforestation), (2) by avoiding their damage or destruction (avoided deforestation), (3) by manipulating existing forest cover (managed forests), and (4) through transferring carbon from the live biomass to the harvested wood product carbon pool. Land-use changes, specifically deforestation and regrowth, are by far the biggest factors on a global scale.

\(^{30}\) A megatonne is one million metric tons of CO\textsubscript{2}; equal to about 2.2 billion pounds.
in forests’ role as sources or sinks of carbon dioxide, respectively (IPCC, Intergovernmental Panel on Climate Change, 2000). Projects like the proposed action and other alternatives that create forests or improve forest conditions and capacity to grow trees are positive factors in carbon sequestration.

3.21 Findings of Consistency

Activities must be consistent with the letter and intent of the Act itself, and the National Forest Management Act (NFMA; Public Law 94-588; 16 U.S.C. 1600) requires specific findings to be made and documented when considering the implementation of certain management practices on National Forest System lands. A review of all activities proposed for the Sunrise project and activity direct, indirect, and cumulative effects found that such activities are consistent with the NFMA. The basis and rationale for this consistency finding is described in this section.

Forest Plan and Amendments

Forest Plan Goals, Objectives, Standards and Guidelines

Forest-wide standards and guidelines (pages 4-47 to 4-93) guide implementation of management actions and pertain to all National Forest System lands located within the Umatilla National Forest, including the Sunrise project planning area. All Forest-wide standards and guidelines pertinent to live and dead forest vegetation are incorporated by reference into both the Management Direction section of this document, as well as project design criteria utilized during any implementation of activities that may occur. Standards and Guidelines that prescribe management activities are incorporated by reference into the design criteria of the Sunrise Project. The project is consistent with the Forest Plan because the activities of the project—or characteristics of those activities—are described and constrained by the Plan itself.

Consistency with Eastside Screens

In 1993, the Natural Resources Defense Council (NRDC) petitioned the U.S. Forest Service (Pacific Northwest Region) to halt all timber harvest activity in old growth forest occurring on national forest lands located east of the Cascade Mountain crest in Oregon and Washington.

That year a group of university and U.S. Forest Service research scientists released an “Eastside Forest Ecosystem Health Assessment” in draft form. In response to the NRDC petition and the collaborative draft, the Pacific Northwest Region of the U.S. Forest Service issued interim direction requiring that timber sales prepared and offered by Eastside National Forests be evaluated to determine their potential impact on riparian habitat, historical vegetation patterns, and wildlife fragmentation and connectivity.

The interim direction known as the Eastside Screens was referenced and followed, along with the Forest Plan, during all planning activities for the Sunrise project. Compliance with the Eastside Screens for all silviculture activities can be found in Appendix C.

Fire and Fuels Management

Implementation of Alternatives B or C complies with the Forest Plan and desired condition for fire and fuels as outlined in the report.

The Umatilla National Forest Land and Resource Management Plan (USDA Forest Service 1990) provides the overall direction of management activities on the Forest (see Chapter 1). Forest-wide management goals, as well as management area direction, represent the desired
future condition that management actions are designed to achieve. Table 3-86 displays the Forest goal and management area direction for the project relative to fire and fuels management.

**Table 3-86. Forest Plan goals and management area direction relative fire and fuels management.**

<table>
<thead>
<tr>
<th>Management Area Description</th>
<th>Management Area Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4 – Viewshed 2</td>
<td>The Desired Future Condition (DFC) for Viewsheds is to maintain or create a near natural landscape. Management activities will be done with sensitivity to people’s concern for scenic quality, with vegetative manipulation conducted so that Forest management activities remain visually subordinate in foregrounds of selected travel routes and sites. All timber management practices and intensities shall be permitted consistent with achieving the primary visual quality goals. Prescribed low intensity fire with minimal scorch is acceptable.</td>
</tr>
<tr>
<td>A6 – Developed Recreation</td>
<td>This Management Area is managed to provide recreation opportunities that are dependent on the development of structural facilities for user conveniences. Trees will be managed on a nonscheduled basis to meet recreation objectives and to reduce the risk of public injury from hazardous trees or vegetation. Slash resulting from hazard tree removal will be available for firewood to campground users.</td>
</tr>
<tr>
<td>C1 – Dedicated Old Growth</td>
<td>This MA is managed to provide and protect sufficient suitable habitat for wildlife species dependent upon mature and/or overmature forest stands, and promote a diversity of vegetative conditions for such species. Timber management and harvest activities will not be scheduled or permitted. Natural fuel treatments are permitted to maintain or enhance old growth habitat characteristics or reduce the potential for a high number of and/or severely burned acres. Prescribed burning is the preferred method of fuel treatment.</td>
</tr>
<tr>
<td>C3 – Big Game Winter Range</td>
<td>The Desired Future Condition (DFC) for this MA is a mosaic pattern of managed forests, brush patches and large grasslands. The management goal is to provide a high level of potential habitat effectiveness and high quality forage for big game. Emphasis will be on cover, forage, and road management. Timber management is on a scheduled basis with emphasis on uneven-aged management. All types of prescribed fire may be used including broadcast burning, underburning, or range burning.</td>
</tr>
<tr>
<td>C4 - Wildlife Habitat</td>
<td>This MA is managed to provide high levels of potential habitat effectiveness for big game and other wildlife species with emphasis on size and distribution of habitat components. Unique wildlife habitats and key use areas will be retained or projected. DFC for the MA is a mosaic of even-aged and uneven-aged stands dispersed in a manner to create a pattern of forage, and marginal satisfactory cover for big game. All timber management practices and intensities consistent with achieving the primary wildlife habitat management goals will be permitted. All types of prescribed fire may be used to accomplish management objectives.</td>
</tr>
<tr>
<td>C5 – Riparian (Fish and Wildlife)</td>
<td>This MA is managed to maintain or enhance water quality, and produce a high level of potential habitat capability for all species of fish and wildlife within the designated riparian habitat areas while providing for a high level of habitat effectiveness for big game. DFC for this MA A near natural setting will predominate adjacent to the stream, with a wide variety of plant communities of various species, sizes, and age classes. In forested riparian zones, a continuous high tree canopy layer will be present and the forest will appear denser than in the surrounding land. Upper and mid-level conifer and hardwood canopy structure and lower shrub level will provide desired levels of stream surface shading, streambank stability, and satisfactory cover for big game. Timber will be managed on a scheduled basis with exceptions (see Forest Plan for exceptions). Prescribed fire may be used, consistent with riparian objectives.</td>
</tr>
</tbody>
</table>
Management Area Description

**C8 – Grass-Tree Mosaic**
Managed to remain natural appearing with predominant view of patches or stringers of timber occurring on open, generally steep hillsides. Many forest stands will appear as mature timber with some having multi-layered canopies. Some stands will be more open as result of management activities designed to improve big game habitat. Forage will be abundant and improved through management. All types of prescribed fire may be used including broadcast burning, underburning, or range burning.

**E2 – Timber and Big Game**
Manage forest lands to emphasize production of wood fiber (timber), encourage forage production, and maintain a moderate level of big game and other wildlife habitat. DFC is to manage for timber production, domestic livestock, big game and other wildlife habitat. Forest will contain a mosaic of even-aged and uneven-aged stands dispersed in a manner creating patterns of tree cover for big game and openings providing forage. Timber will be managed on a scheduled basis. All timber management practices and intensities will be permitted. Prescribed fire may be used to accomplish a variety of timber and forage production objectives.

**Asotin Creek Inventoried Roadless Area**
The Asotin Creek Inventoried Roadless Area is overlaid with Umatilla Forest Plan Management Allocation Designations. Primary allocations are C3, C3A and C8 (described above) and all allow the use of prescribed fire for management activities.

Table 3-87 further compares fuels treatments by management area for each action alternative.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grapple Pile</td>
<td>Jackpot Burn</td>
</tr>
<tr>
<td>A4 - Viewshed 2</td>
<td>483</td>
<td>-</td>
</tr>
<tr>
<td>A6 - Developed Recreation</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>C1 - Dedicated Old Growth</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C3A - Sensitive Big Game Winter Range</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C3 - Big Game Winter Range</td>
<td>-</td>
<td>67</td>
</tr>
<tr>
<td>C4 - Wildlife Habitat</td>
<td>564</td>
<td>810</td>
</tr>
<tr>
<td>C5 - Riparian (Fish and Wildlife)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C8 - Grass-Tree Mosaic</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E2 - Timber and Big Game</td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

**Overall Goal** - Provide and execute a fire protection and fire use program that is cost efficient and responsive to land and resource management goals and objectives.

**Specific to fuels management** – Levels and methods of fuels treatment will be guided by the protection and resource objective of the management area. Emphasis will be on intensive utilization of wood residues using a marketing strategy to reduce fuel loadings; and prescribed fire will be utilized to meet management objectives and maintain fuel profiles in all ecosystems.

Other applicable regulatory framework that guides fuel activities is located in the Fuels specialist’s report.

**Wildlife resources**
All alternatives would be consistent with Forest Plan standards and guidelines, because they would meet project design criteria set for the project, meet standards and guidelines for affected land management allocations, and provide for viable populations of wildlife species. All alternatives would provide for diversity of plant and animal communities in the Sunrise project area, based on the suitability and capability of the land therein. All project alternatives are consistent with the Endangered Species Action, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Facilitation of Hunting Heritage and Wildlife Conservation Executive Order.

**Fisheries resources**
All of these alternatives would be consistent with Forest Plan direction regarding native fish populations. None of the potential effects of timber harvest, fire/fuels management and associated activities, under any of these alternatives, would be expected to retard progress towards PACFISH Riparian Management Objectives. Application of PACFISH direction would maintain or improve fish habitat conditions in the analysis area.

Consultation on the Sunrise Vegetation and Fuels Management Project, with NOAA Fisheries, would occur spring 2018. The project May Affect, Not Likely to Adversely Affect ESA listed SRB steelhead and their DCH. Besides those just mentioned, there would be no effects to other listed fish and their designated critical habitats or sensitive species and their habitats.

**Effects to Management Indicator Species**
For redband trout, a Forest management indicator species, no alternatives would result in any direct, indirect or cumulative population level effects nor a negative habitat trend at either the watershed or Forest scale. Project design criteria and BMP monitoring would ensure that the probability and magnitude of those effects remain both unlikely and immeasurable to the extent they occur.

As a result, the proposed activities under these alternatives would not affect the viability of redband trout at the watershed scale.

For steelhead, a Forest management indicator species, the overall direct and indirect effects of any of this project’s action alternatives would limit effects to steelhead and their habitat at the project scale and thus at the forest scale, due to distance from project activities, and due to project design criteria and BMP monitoring that would ensure any effects from activities, to the fish habitat indicators, would be unlikely and immeasurable. No alternatives would reduce population viability or result in a negative habitat trend at either the watershed or Forest scale.

During the 5-year ESA status review of the Snake River Basin steelhead, it was determined that the Asotin Creek summer steelhead population remains not viable mainly due to the lack of data on adult spawners and productivity (NMFS, 2011). This project would not retard recovery of populations in the Lower Snake River. The project is consistent with the Forest Plan as amended by PACFISH; none of the project alternatives would retard recovery of Snake River Basin steelhead within NFS lands; they are all consistent with relevant standards and guidelines for the various activities.

**First Foods**
The Sunrise Vegetation and Fuels Management Project alternatives would not impact fisheries resources, which are one of the First Foods within the analysis area. These resources are valued by Native American tribal members, who hunt and gather salmonid species in their usual and
acclimated areas. The effects determination made for the Sunrise Vegetation and Fuels Management project was that it “May effect, but not likely to adversely affect” Snake River Basin steelhead or their designated critical habitat and “will not adversely affect” Essential Fish Habitat for salmon. The project “may effect, but not likely to adversely affect” SR Chinook salmon or their designated critical habitat due to the distance between the project activities and occupied habitat and through the implementation of Design criteria and BMPs.

**Hydrology**

The Umatilla National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines. Implementation of design criteria and best management practices as described above, Umatilla National Forest Road Use Rules, as well as standard Umatilla NF timber sale contract specifications or the corresponding stewardship contract specifications would constitute compliance with the Umatilla National Forest Land and Resource Management Plan for hydrologic and water quality components.

Neither action alternative would have direct or indirect effects to hydrologic function, floodplains, water temperature, sediment, or water yield, as all actions will not take place in, let alone near RHCAs, and any potential effects to water resources from supporting activities such as haul road traffic will be mitigated.

**Soils**

Multi-Use Sustained Yield Act of 1960, directs the agency to manage resources (outdoor recreation, range, timber watershed and fish) in combination that best meets the needs of the American people. Sustained yield means achieving and maintaining into perpetuity a high-level annual or regular periodic output of renewable resources without impairment of the productivity of the land.

Forest Service Manual (FSM) 2500 has the objective (FSM 2551.02) to determine if land management practices need adjustments to sustain or restore soil quality.

The FSM 2551.5 further states that the use of soil quality indicators ultimate goal is to provide information on the health of the soil. For example; when an indicator (i.e. tree growth), is altered by management practices. This type of alteration to soil indicators is considered an expression of a detrimental change to the productivity of the soil resource.

The Desired Future Condition in the 1990 Forest Plan for water/soil is to maintain soil productivity (Forest Plan p. 4-9). The plan further states that Standards and Guidelines are to maintain a minimum of 80 percent of an activity area in a condition of acceptable productivity potential. Acceptable productivity is defined as:

- Less than 20% increase in bulk density of volcanic soil or a less than 15 percent increase in soil bulk density for other forest soils.
- Soil disturbance of less than 50 percent of the topsoil humus enriched A1 and or AC horizons from an area 100 sq. ft. (i.e. 5ft by 20ft)
  - Molding of the soil in vehicle tracks that are rutted to a depth less than 6 inches.
- Severely burned soil with the top layer of mineral soil altered in color (usually to red) and the next ½ inch blackened from organic matter charring.
- Plan and conduct land management activities so that soil loss from surface erosion and mass wasting, caused by activities would not result in an unacceptable reduction in soil productivity or water quality.
Management activities shall be designed and implemented to retain sufficient ground vegetation and organic matter to maintain long-term soil and site productivity.

Active slump and landslide areas are considered unavailable for road construction. Areas with known landslide potential and lake sediments require special transportation planning and design, layout preconstruction, construction and maintenance techniques.

A certain amount of overlap occurs when logging activity happens on units with existing detrimental soil condition as machinery reuses some trails and landing sites. This tends to reduce the amount of added, new detrimental soil impacts. However, this was not used to reduce the estimated increase percentage in DSC in the assessment due to uncertainty on the extent of this effect on a specific unit. This will likely lead to some overestimation of total potential DSC in units with existing soil disturbance from previous activity.

Cumulative effects relative to erosion hazard are not relevant within treatment units as surface recovery occurs rapidly enough to eliminate this as a cumulative concern. Data collected during a fuels treatment study (Wondzell and Clifton 2005) in the Sunrise Project area found that ground cover was maintained to Forest Plan Standards (Figure 4). The study monitored hillslope erosion for three treatments: prescribed fire; commercial timber yarding followed by prescribed burning; and yarding of all fuels (> 3” dbh) followed by prescribed burning.

Soil rehabilitation of adverse soil conditions is expected to be necessary on several units with existing high levels of DSC (see Soils report). Obliteration of temporary roads, scarification/subsoiling of landings, and retention of as much organic matter as fire risk/fuel objectives will help ameliorate and rehabilitate site conditions for productive capacity and reduced erosion hazard.

**Botany**

This project is consistent with Forest Plan goals (p. 4-7) and Forest-wide standards and guidelines (pp. 4-89 to 4-90). As required, a Biological Evaluation for plant species is available and located in the project analysis file.

**Invasive plants**

The proposed Sunrise project is consistent with the Forest Plan, as amended, with respect to noxious weeds. This finding is based on the above discussions of existing condition, the mechanisms of invasive species spread, and the inclusion of prevention measures included in Chapter 2, which are identical to those described in the Forest Plan.

**Visual Resources (scenery)**

Alternatives B and C would remain compliant with the Forest Plan standards and guides for Visual Quality Objectives and Scenery Management, because analyzed activities would result in site-specific conditions consistent with Forest Plan allocations.

**Inventory Roadless Areas (IRA), Potential Wilderness Areas (PWA) and other Undeveloped Lands**

All 4,527 acres of undeveloped lands identified within the analysis area would not qualify as a Potential Wilderness area, Inventoried Roadless Area, or a designated Wilderness area. This outcome is consistent with the intent of the land allocation decisions made in the Forest Plan.
Recreation
All action alternatives would be in compliance with the Forest Plan, forest wide standards and guidelines for recreation.

Air quality
Implementation of any action alternative would remain consistent with the Forest Plan management goal #18—to maintain air quality at a level adequate for protection and use of forest resources and which meets or exceeds applicable Federal and state standards (Forest Plan p. 4-2). Air quality standards would be maintained at a level to meet Washington State and Federal standards (Clean Air Act) through coordination and compliance with Washington State DNR guidelines and approval process. Available predictive and management methods and models would be used to minimize the effects of smoke on any smoke sensitive areas.

Range
All action alternatives would be consistent with Forest Plan objectives to manage grazing resources to maintain and improve vegetative conditions compatible with protecting and maintaining use of the Asotin and Peola C&H Allotments.

Forest products
The Forest Plan provides standards and guidelines for the production of forest products. All action alternatives comply with this plan by providing wood products for local communities.

National Forest Land Suitability
Finding: As described in the Management Direction section of this report, all silvicultural activities would be implemented only on lands meeting the definition of forest land (16 U.S.C. 1604) and designated as suitable for timber production by the Forest Plan (USDA Forest Service 1990), as amended.

Appropriateness of Even-aged Management
Finding: All proposed even-aged management is considered an appropriate method to achieve the identified objectives and other Forest Plan components such as desired future conditions. All stands where even-aged management is prescribed would have generally reached culmination of mean annual increment (see project design criteria). Implementation of the proposed regeneration silvicultural activities would result in created openings, as defined by Forest-wide direction in the Forest Plan, but none of the created openings would exceed 40 acres in size.

Optimality of Clearcutting
Finding: Any silvicultural prescriptions designating a clearcutting activity would only do so if such an activity is found to be the optimal silvicultural activity (see project design criteria). This determination would be made using criteria provided in the Forest Plan: “stand condition and structure; insect and disease problems; silvics of the tree species concerned; plant community; logging method feasibility and probability of success; site characteristics; regeneration difficulty; economics; and other factors all in the context of meeting the resource objectives for that management area portrayed in the Forest Plan” (USDA Forest Service 1990, page 4-68).

All silvicultural prescriptions recommending a clearcutting activity would do so only if it is found to be an activity of last resort—only proposed when no other intermediate (preferred) or regeneration cutting method to meet stand management objectives would be appropriate or compatible with existing stand conditions. A major factor in this determination would likely be
the presence or absence or a sufficient number of acceptable seed trees. This means that clearcutting would be proposed only when the silvicultural prescription for a given stand shows a clearcutting method would accomplish Forest Plan objectives that cannot be accomplished through other cutting methods.

**Finding:** To the extent practicable, clearcut units would be shaped and blended to emulate the analysis area’s natural terrain (see project design criteria).

### Vegetation Manipulation

**Finding:** Tree stand manipulation complies with requirements found in 16 U.S.C. 1604:

1. The proposed silvicultural activities are well suited to the multiple-use goals and objectives established for the Sunrise planning area when considering the potential environmental impacts associated with their implementation.
2. There is ample assurance that lands proposed for regeneration cutting (created openings in the context of the Forest Plan) would be adequately restocked within five years after final harvest, because no activities would be conducted in locations in which the silvicultural prescription does not amply demonstrate the capacity for restocking (see project design criteria).
3. The proposed silvicultural prescriptions were not chosen primarily because they would give the greatest dollar return or the greatest output of timber, although these factors were considered when evaluating whether a proposed silvicultural activity was economically feasible.
4. The potential implementation effects on residual trees and adjacent stands were considered when developing the silvicultural proposals.
5. No permanent (e.g., irreversible) impairment of site productivity is expected as a result of the proposed silvicultural activities, and the project’s design criteria, management requirements, and best management practices ensure conservation of soil, slope, and other watershed conditions.
6. Riparian Habitat Conservation Areas (RHCAs) would be specifically designated on the ground in such a way as to exclude their full extent from any adjacent upland forest area selected for silvicultural treatment.
7. Silvicultural activities proposed for implementation in the Sunrise Vegetation and Fuels Management Project are expected to provide desired effects with respect to water quantity and quality, wildlife and fish habitat, regeneration of desirable tree species, forage production, recreation uses, aesthetic values, and other resource yields.
8. Silvicultural activities proposed for implementation in the Sunrise Vegetation and Fuels Management Project are considered practical in terms of transportation and harvesting requirements, and total financial costs of project preparation, timber harvest, and sale administration.

### Endangered Species Act

#### Vegetation

This project complies with present Federal regulations (ESA) pertaining to the management of Threatened, Endangered, and Sensitive plant species.

#### Fish and Wildlife Species

With regards to threatened and endangered species, a determination has been made that the proposed actions would not result in irreversible or irretreivable commitment of resources that foreclose formulation or implementation of reasonable or prudent alternatives. Consultation for
Canada lynx and yellow-billed cuckoo is not necessary since a determination has been made that the proposed activities would have no effect to these species. Conferencing for wolverine is not necessary since a determination was made that there would be not likely to jeopardize the continued existence of wolverine.

**Sensitive Fish, Wildlife and Invertebrate Species**
A biological evaluation (BE) was completed for federally listed and proposed endangered and threatened species, and for animal species currently listed as sensitive on the Regional Forester's Sensitive Species List (project file). Determinations were made that none of the proposed project activities would adversely affect, contribute to a trend toward federal listing, nor cause a loss of viability to listed animal populations or species.

**Migratory Bird Treaty Act**
All action alternatives are consistent with the 1918 Migratory Bird Treaty Act (MBTA) and the Migratory Bird Executive Order 13186. Species of concern were considered and the Conservation Strategy for Landbirds (Altman 2000) was reviewed for effects disclosures. Design criteria such as retention of adequate snags and down logs, retention of live trees, and avoidance of riparian areas proposed in this project would minimize take of migratory birds and meet the intent of current management direction.

**Bald and Golden Eagle Protection Act**
All action alternatives comply with the National Bald Eagle Management Guidelines (USFWS 2007) and the Bald and Golden Eagle Protection Act. Use of the area by eagles is sporadic, and no nesting or roosting habitat would be affected by the proposed activities.

**Facilitation of Hunting Heritage and Wildlife Conservation Executive Order**
Both action alternatives meet the intent of the Facilitation of Hunting Heritage and Wildlife Conservation Executive Order, specifically by proposing enhancements to elk winter range and bighorn sheep habitat.

**Clean Water Act of 1972**
The Clean Water Act of 1972 and amendments require the restoration and maintenance of the chemical, physical, and biological integrity of the nation’s waters. All of the activities proposed in this project were designed to be consistent with the Clean Water Act and State of Washington Water Quality Standards.

**Floodplains, Executive Order 11988**
E.O. 11988 requires the Forest Service to avoid “to the extent possible the long and short term adverse impacts associated with the ... occupation ... or modification of floodplains...” The E.O. also provides direction to restore and preserve the natural and beneficial values served by floodplains. Actions proposed in the Sunrise Project would preserve the beneficial values of floodplains within the project area and for this reason, the Sunrise Project is consistent with this EO.

**Wetlands, Executive Order 11990**
E.O. 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the ... destruction or modification of wetlands." The Sunrise Project does not propose to destroy or modify any wetland. For this reason, the Sunrise Project is consistent with this EO.
Executive Order 12898

Executive Order 12898, issued in 1994 orders Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. The Order also directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife. None of the alternatives restrict or alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights for hunting and fishing on the Umatilla National Forest are included on the project mailing list and have the opportunity to provide comments on this project. More employment and income opportunities would be created by each action alternative than by Alternative 1 (no action). Implementation of either action alternative would not likely adversely affect minority or low-income populations.

Municipal Watersheds

There are no designated municipal watersheds in the Sunrise Project area.

Treaty Resource Protection

In this analysis, the primary focus of the federal government Trust Responsibility is the protection of the treaty rights and interests that tribes reserve on land included in this project. The Nez Perce Tribe has treaty rights and interests in the South George area.

A government-to-government scoping letter was sent to staff members of the Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation on December 14, 2014, informing them of the Sunrise proposed project and requesting any comments or concerns regarding the project. The Pomeroy District Ranger presented the District Program of Work to Nez Perce tribal staff members on in the spring of 2015, 2016, and 2017, and continued to update the Nez Perce tribal staff members at subsequent opportunities. At these meetings, projects are presented and the District Ranger solicits questions, comments, or requests for additional information. Several field trips were also organized with tribal staff members on June 29, 2015, December 08, 2015, and October 24, 2016 to view the project area, discuss potential treatments, answer any questions and address any concerns. No specific comments or concerns for South George project were presented by tribal staff members after the government to government consultation scoping letter or Program of Work meetings. Tribal staff members have identified for similar past projects the rights they believed most at risk. Of major concern are potential effects on Treaty rights, fish habitat and populations, water quality, and protection of archaeological sites, traditional cultural properties, and first foods resources.

Cultural Resource surveys were conducted to locate cultural sites and gather the information necessary to evaluate historic properties. Identified sites and any newly recorded sites would be protected from all project activities associated with the Sunrise Vegetation and Fuels Management Project (Chapter 2, Table 2-5). A Project Review for Heritage Resources under the terms of the 1997 Programmatic Agreement between ACHP, SHPO, and USFS R6, has been completed (2/14/12). A No Adverse Effect (with stipulations) determination was made.

Timber harvest has the potential to negatively affect water quality and thus indirectly aquatic habitat. The effects of harvest and associated activities on water quality are discussed in the Hydrology section in this chapter. It was found that effects of the action alternatives would not adversely or measurably affect water quality.

The action alternatives were designed to prevent damage to RHCAs. Riparian and channel components that protect water quality would be maintained over the long run.
Other design criteria and BMPs would control disturbance that could lead to erosion and sedimentation.

The effects of harvest and associated activities on aquatic species and habitats are found in the Fisheries section. It was determined that action alternatives may effect – not likely to adversely affect threatened species and may impact some sensitive species (see Table 3-15). Based on the information summarized above, it is reasonable to assume that treaty rights would be protected during implementation of the proposal.

3.22 Short-term Uses and Long-term Productivity

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).

3.23 Unavoidable Adverse Effects

Effects that cannot be avoided due to constraints in alternatives. These effects do not have to be avoided by the planning agency, but they must be disclosed, discussed, and mitigated, if possible (40 CFR 1500.2(e).

Other than Soil resources, there are no effects that will not be mitigated through basic forest guidelines or implementation of BMPs.

Concerning soils, as it may apply to temporary roads placed on shallow soils, some effects may be irreversible depending upon the depth of impact, organic matter present in the soil and the depth of the soil itself. These areas are of minimal importance to timber production, but have a multitude of other resource values. These impacts over time may be colonized by noxious weeds and other pioneer species suited to such undeveloped conditions; which may lead to other resource damage. Therefore these types of impacts are expected to minimize to reduce the occurrence of irreversible damage to the soil resource.

3.24 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 rights-of-way or road.

For all action alternatives (B and C) there would be no irreversible or irretrievable commitment of resources with implementation of proposed activities.

3.25 Other Required Disclosures

This section describes how the action alternatives comply with applicable state and Federal laws, and Forest Service policies and regulations.
National Historic Preservation Act – Heritage surveys have been completed. State Historic Preservation Office consultation was conducted under the Programmatic Agreement among the United States Department of Agriculture, Forest Service, Pacific Northwest Region (Region 6), the Advisory Council on Historic Preservation, and Washington State Historic Preservation Officer regarding Cultural Resource Management on National Forests dated April 1997. Identified sites and any newly recorded sites are protected from all project activities associated with Sunrise Vegetation and Fuels Management Project. Because heritage resources would not be affected by proposed activities under any action alternative, there would be no effect to any historic property listed in or eligible to the National Register of Historic Places.

Endangered Species Act and Regional Forester's Sensitive Species - The Endangered Species Act requires protection of all species listed as "Threatened" or "Endangered" by Federal regulating agencies (Fish and Wildlife Service and National Marine Fisheries Service). The Forest Service also maintains through the Federal Register a list of species which are proposed for classification and official listing under the Endangered Species Act, species which appear on an official State lists, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists. Biological Evaluations have been completed for all TE&S plant, aquatic and terrestrial wildlife. Details are found in the Fisheries, Botany, and Wildlife sections of this chapter, and relevant appendices.

Wild and Scenic River Act – There are no Wild and Scenic Rivers within the project area. No designated or potential wild and scenic river sections would be affected by implementation of any alternative.

Prime Farmland, Range Land, and Forest Land - No adverse effects on any prime farmland, range land, and forest land not already identified in the Final DEIS for the Forest Plan would be expected to result from implementation of any alternative. Civil Rights, Women, and Minorities - No adverse effects on civil rights, women, and minorities not already identified in the DEIS for the Forest Plan would be expected to result from implementation of any alternative. Alternatives B and C would be governed by Forest Service contracts, which are awarded to qualified contractors and/or purchasers regardless of race, color, sex, religion, etc. Such contracts also contain nondiscrimination requirements.

National Forest Management Act Compliance – The National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378), states that when trees are cut to achieve timber production objectives, the cuttings shall be made in such a way that “there is assurance that such lands can be adequately restocked within 5 years after harvest” (P.L. 93-378, Sec. 6, (g), (3), (E), (ii)). See Appendix C, pp. C-9 to C-10.

This reforestation policy is based specifically on language from the National Forest Management Act of 1976 (P.L. 94-588), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378): “Sec. 3 (d) (1) It is the policy of the Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans.”

Treaty Trust Responsibilities - In this analysis, the primary focus of the federal government Trust Responsibility is the protection of the treaty rights and interests that tribes reserve on land.
included in this project. The Nez Perce Tribe has treaty rights and interests in the Sunrise project area.

A government to government scoping letter was sent to tribal staff members of the Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation on December 14, 2014, informing them of the Sunrise proposed project and requesting any comments or concerns regarding the project. The Pomeroy District Ranger presented the District Program of Work to Nez Perce tribal staff members on in the spring of 2015, 2016, and 2017, and continued to update the Nez Perce tribal staff members at subsequent opportunities. At these meetings, projects are presented the District Ranger solicits questions, comments, or requests for additional information. Several field trips were also organized with tribal staff members on June 29, 2015; December 08, 2015; and October 24, 2016 to view the project area, discuss potential treatments, answer any questions and address any concerns.

Cultural Resource surveys were conducted to locate cultural sites and gather the information necessary to evaluate historic properties. Identified sites and any newly recorded sites would be protected from all project activities associated with the Sunrise Vegetation and Fuels Management Project. A Project Review for Heritage Resources under the terms of the 1997 Programmatic Agreement between ACHP, SHPO, and USFS R6, is underway.

Timber harvest has the potential to negatively affect water quality and thus indirectly aquatic habitat. The effects of harvest and associated activities on water quality are discussed in the Hydrology section in this chapter. It was found that effects of the action alternatives would not adversely or measurably affect water quality. The action alternatives were designed to prevent damage to RHCAs. Riparian and channel components that protect water quality would be maintained. Other design criteria and BMPs would control disturbance that could lead to erosion and sedimentation.

The effects of harvest and associated activities on aquatic species and habitats are found in the Fisheries section. It was determined that action alternatives may effect – not likely to adversely affect threatened species and may impact some sensitive species.

Based on the information summarized above, it is reasonable to assume that treaty rights would be protected during implementation of the proposal.

**Roads Analysis** - A Forest-wide Roads Analysis was completed in March 2004 on the Umatilla National Forest. The forest scale analysis addressed only those National Forest System Roads maintained for passenger car traffic, arterial, and collector roads. The Sunrise project planning area has arterial, collector, and local roads. These roads are seasonally opened or are closed system roads. A site-specific project Roads Analysis containing a road risk value for each road was completed for this project and is located in the project file. This project analysis also includes maps showing the risk value for each road and the operational maintenance level of each road in the project planning area. A summary list of miles of roads used as haul routes for each alternative and other proposed road activity such as temporary road construction, and proposed decommissioning of roads in Alternative C is found in Table 2-11. No new system road construction is proposed for this project.

**Floodplains, Executive Order 11988** – Executive Order (EO) 11988 requires the Forest Service to avoid “to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains…” The proposed alternatives would avoid all floodplains and affects to floodplains and is consistent with this EO.
**Wetlands, Executive Order 11990** - Executive Order (EO) 11990 requires the Forest Service to “avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands.” The proposed alternatives would avoid all wetlands and affects to wetlands and is consistent with this EO.

**Municipal Watersheds** - There is no de-facto or designated municipal watershed in the Sunrise project planning area.

**Energy Requirements** - No adverse effects on energy requirements would be expected to result from implementation of any alternative.

**Public Health and Safety** - Public health and safety would be improved with Alternatives B and C removing danger trees along open forest routes, haul routes, developed recreation sites, and administrative sites within the Sunrise project planning area.

**Environmental Justice** – No local minority or low income populations were identified during scoping or environmental effects assessment. No minority or low-income populations are expected to be affected by implementation of any of the alternatives, in accordance with Executive Order 12898.

### 3.26 Cumulative Impacts

Detailed findings for issues pertaining to the project purpose and need, as well as issues driving alternatives are described below. Findings and conclusions are discussed in comparative format between management alternatives. Additional findings for other resource issues are then briefly discussed. Alternatives B and C would meet the project purpose and need elements discussed in Chapter 1 to some degree, with Alternative B doing so more than Alternative C. Because the purpose and need elements would trend away from desired conditions under Alternative A, it does not meet the project purpose and need at all.

**Forest Vegetation Composition, Structure, and Density**

The direct, indirect, and cumulative effects of the action alternatives would not result in changes of species cover types in all locations, but changes that would occur generally would involve a shift from currently overrepresented cover types dominated by late seral species to currently underrepresented cover types dominated by early seral species. Under Alternative B, planned activities would reduce the extent of Douglas-fir, grand fir, and subalpine fir-spruce cover types by approximately 3900, 1560, and 1940 acres, respectively. Under Alternative C, planned activities would reduce the extent of Douglas-fir, grand fir, and subalpine fir-spruce cover types by approximately 3260, 870, and 1060 acres, respectively. Each of these respective cover types would generally be converted to a “mix” cover type (e.g., grand fir / mix).

A cover type with the term “mix” added is a cover type with the named shade-tolerant species present along with a plurality of early seral/shade-intolerant species such as western larch, lodgepole pine, or ponderosa pine. The expected changes in extent indicate that Alternative B results in the greatest area converted to a cover type in which an early seral conifer species constitutes a majority and/or plurality of the overstory forest canopy.

Although it is not possible to evaluate conversions to a “mix” cover type relative to desired ranges of single-species cover types, both action alternatives would increase the relative abundance of currently underrepresented early seral species. Alternative B would increase the
relative abundance to a greater degree than alternative C, and Alternative A (the no-action alternative) would fail to do so at all.

The direct, indirect, and cumulative effects of the action alternatives would not result in changes of species cover types in all locations, but changes that would occur generally would involve a shift from currently overrepresented structural stages (understory reinitiation and/or old forest multi-strata) to currently underrepresented structural stages (stand initiation, stem exclusion, and/or old forest single-strata). Under Alternative B, planned activities would reduce the extent of stands in the understory reinitiation and old forest multi strata stages by approximately 2020 and 4,570 acres, respectively. Activities planned as part of Alternative B would increase the extent of stands in the stand initiation, stem exclusion, and old forest single stratum stands by approximately 668, 1860, and 4,065 acres, respectively. Under Alternative C, planned activities would reduce the extent of stands in the understory reinitiation and old forest multi strata stages by approximately 810 and 3,330 acres, respectively. Activities planned as part of Alternative C would increase the extent of stands in the stand initiation, stem exclusion, and old forest single stratum stands by approximately 330, 990, and 2,820 acres, respectively. Stands currently in the old forest multi strata stage would remain old forest, but be converted to the old forest single stratum stage. The expected changes in extent indicate that Alternative B would result in the greatest area converted from currently overrepresented structural stages (generally understory reinitiation and old forest multi strata) to currently underrepresented stages (generally stand initiation, stem exclusion, and old forest single strata).

Forest Density is defined as the measure of the amount of tree vegetation per unit of land area. The direct, indirect, and cumulative effects of the action alternatives would not result in changes of density class in all locations, but changes that would occur generally would involve a shift from stands currently in the moderate and high classes to low and moderate classes, respectively. Under Alternative B, planned activities would reduce the extent of stands in the high density class by approximately 9,450 and 4,570 acres, respectively. Activities planned as part of Alternative B would increase the extent of stands in the low and moderate classes by approximately 4,130 and 5,320 acres, respectively. Under Alternative C, planned activities would reduce the extent of stands in the high density class by approximately 7,000 acres. Activities planned as part of Alternative C would increase the extent of stands in the low and moderate density classes by 1,850 and 5,150 acres, respectively. The expected changes in extent indicate that Alternative B would result in the greatest area converted from currently overrepresented high density classes to currently underrepresented low and moderate density classes.

Fire Regime Condition Class
The proposed treatments would affect FRCC by moving landscape conditions (fuel load, canopy base height, stand structure and composition) toward HRV represented by Condition Class 1 from Condition Classes 2 and 3. Recommended treatments would reduce fuel loading and ladder fuels, increase canopy base height, reduce canopy bulk density and favor fire tolerant species. Treatment under all action alternatives would serve to emulate the stand conditions anticipated under the historical fire regime. Alternative B would do this to a greater degree than Alternative C, and both much more so than Alternative A.

Timber Production
A component of the purpose and need of the Sunrise project is to make available forest products to the region and local communities. Both action alternatives will undergo silviculture treatments which include commercial timber harvesting. Alternative B would include harvests across
approximately 5,530 acres, providing an estimated 25.6 million board-feet, while Alternative C would include harvests that provide approximately 12.1 million board-feet across 2,560 acres.

**Wildlife Habitat**

During the scoping process, the need to manage and maintain wildlife habitat was restated. The wildlife specialist report addresses potential impacts and findings for each alternative for all indicators considered, primarily focusing on management indicator species (MIS).

For all indicators, the No Action alternative is not expected to have any direct/indirect as well as cumulative effects. Current conditions are expected to persist outside the desired range.

Alternatives B and C would both maintain the area within forest plan standards for elk. Activities such as burning and thinning are expected to improve forage. It is expected that all MIS species including American marten, pileated woodpecker, and Northern three-toed woodpecker would continue to have viable populations on the forest. Snag and down wood habitat guidelines will be followed.

**Additional Findings**

**Soil condition.** All alternatives would be consistent with Forest Plan Standards and Guidelines for achieving soil quality maintenance objectives, including detrimental soil condition and effective ground cover.

**Water quality and quantity.** Effects of proposed actions would not adversely or measurably affect water temperature. The proposed project is in compliance with the Clean Water Act, and meets or exceeds all Forest Plan Standards and Guidelines for Direct, Indirect, or Cumulative Effects to vegetation, wildlife, cultural, and recreation resources.

**Threatened, Endangered and Sensitive species.** Depending on the species and location, the activities would have no effect or may affect, but are not likely to adversely affect all applicable and/or affected Threatened, Endangered, Proposed, and Sensitive fish, wildlife and plant species.

**Invasive plants.** Within the Sunrise project boundary, the primary difference in effects to invasive plant species from each project alternative is shown by the differing numbers of acres that are placed at high risk of noxious weed spread. Alternative B creates the most acreage at high vulnerability for weed infestation, due to the slightly larger amount of ground disturbing activities proposed. The smaller area of ground disturbance in Alternative C results in slightly fewer acres at high risk. There is potential for an increase in noxious weed infestation within the planning area due to existing conditions and the types of activities analyzed. Invasive weeds, however, are already present in the project area, and will be treated regardless of alternative selected.

**Developed recreation.** Proposed harvest activities would create short term effects which could potentially alter the recreation setting. However, the proposed activities do not alter the setting enough to measurably affect the recreation experience.

**Economics and forest products.** Alternative B was found to be economically viable, and has a higher present net value (PNV) than Alternative C.

**Visual quality.** It is expected that all of the activities proposed in all of the action Alternatives would meet the visual quality objectives of the Forest Plan. The impacts would not exceed the
limits of visual impacts defined by modification and partial retention. Characteristics of scenic integrity and stability are expected to be maintained or enhanced.

**Potential Wilderness Areas (PWAs).** For the Asotin Creek PWA activities proposed in or near the PWA under Alternatives B and C, smells, sounds and possible sighting of mechanical activities and fuel treatment activities, would reduce a sense of solitude and remoteness in the short-term, during project activity. Activities adjacent to PWAs would not preclude the PWAs from being retained in the PWA inventory.

**Roadless Area characteristics.** The only activity slated for Inventoried Roadless Area (IRA) is 6,335 acres of prescribed fire. Under both Alternatives B and C there would be no direct effects to the Asotin Creek IRA. Indirect effects are predicted to be positive as biological and ecosystem functions are believed to improve under each action alternative as fire will be reintroduced to a fire-dependent ecosystem. The sounds, air quality, and possible sighting of mechanical activities and fuel treatment activities occurring within and areas adjacent to the IRA would reduce a sense of solitude and remoteness in the short-term, during project activity. In the long-term, however, there would be no change to the availability of solitude or primitive recreation.

**Other Undeveloped Lands.** All treated units would remain forested after harvest although skid trails, stumps, and landings could be evident. Stand structure would change, therefore, diversity of plant and animal communities may shift from current patterns but ecological diversity would remain (Chapter 3, Vegetation 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 increased numbers of stumps and the open nature of the forest stand would likely be the most apparent visual change resulting from implementation. The sounds of machinery from active units would reduce a sense of naturalness and solitude during project operations but would not persist in the long term. All proposed activities within Undeveloped Lands will be consistent with Forest Plan guidelines and project design criteria will help reduce impacts to soils, plants, habitat, recreation, and water quality.
Chapter 4. Consultation and Coordination

4.1 Interdisciplinary Team Members

The following Interdisciplinary Team members are USDA Forest Service employees who participated and contributed in the development of the Project’s Purpose and Need, Proposed Action, Public Involvement planning actions, Alternatives for analyses and undertook the field studies, resource report preparation, and analyses of impacts to individual resources from implementation of alternatives. The section includes information regarding the names of those IDT members, with their qualifications (expertise, experience, professional disciplines), who were primarily responsible for preparing the draft environmental impact statement and/or significant background papers, (§1502.6 and 1502.8).

Brooks, Paula J.
Umatilla National Forest, Forest Botanist
Contribution: Botany Analysis and TES plants

Bassett, Jill (Retired)
Umatilla National Forest, Forest Archeologist
Contribution: Heritage Resources

Collin, Johnny
Umatilla National Forest, North Zone TMA
Contribution: Economics Analysis

Dixon, Donna
Umatilla National Forest, GIS Specialist
Contribution: GIS and Map Products

Dowdy, William
Umatilla National Forest, Fisheries Biologist
Contribution: Fisheries Analysis

Druffel, Angela S.
Umatilla National Forest, Pomeroy Ranger District, Range Technician
Contribution: Range Analysis

Fujishin, Monte
Umatilla National Forest, Pomeroy Ranger District, District Ranger
Contribution: Line officer providing management, guidance and oversight

Harris, Holly
Umatilla National Forest, North Zone Wildlife Biologist
Contribution: Wildlife Analysis

Hickman, Tracii
Umatilla National Forest, ESA Consultation Biologist
Contribution: Oversight of TES process and consultation requirements

Justice, Donald C.
Umatilla National Forest, Vegetation Analyst
Contribution: Data Analyses/Vegetation Modeling

Mackleit, Tara
Umatilla National Forest, Pomeroy Ranger District, Fire/Fuels Technician
Contribution: Fuels and Air Quality Analysis

Mandersheid, John
Umatilla National Forest, Roads and Trails Manager
Contribution: Transportation Analysis

**Marquardt, William**
Umatilla National Forest, Pomeroy Ranger District, North Zone Archeologist
Contribution: Heritage Resources

**Mattson, Donna**
Wallowa-Whitman, Malheur, and Umatilla National Forest, Tri-Forest
Landscape Architect
Contribution: Scenery/visuals Analysis.

**Napkora, Zigmund**
Umatilla National Forest, North Zone Hydrologist
Contribution: Hydrology/Water Quality Analysis, Soils Analysis

**Pfeifer, Eric**
Umatilla National Forest, North Zone Forester, Noxious Weed Coordinator
Contribution: Invasive Plant Analysis, Forest Vegetation Analysis, Visuals Analysis.

**Randall, Larry**
Umatilla National Forest, Recreation and Wilderness Program Manager
Contribution: Recreation, Inventoried Roadless Area and Potential Wilderness Area Analysis.

**Richardson, Katherine**
Umatilla National Forest, Environmental Coordinator
Contribution: NEPA Oversight and Review

**Taylor, Leslie**
Umatilla National Forest, South Zone Environmental Coordinator
Contribution: NEPA Oversight and Review

**Trick, Brian**
Umatilla National Forest, Pomeroy Ranger District, Writer/Editor
Contribution: Document Revision, Writer/Editor

### 4.2 Federal, State, and Local Agencies Consulted and Requesting the Environmental Impact Statement

An electronic or hardcopy of this Draft Environmental Impact Statement will be provided to those specifically requesting copies by postal mail or email. In addition, the DEIS and all related documents were placed on the Forest Webpage, as well as published in the Umatilla NF Schedule of Proposed Actions (SOPA) for official public distribution to whomever is interested or affected by the proposed action. The DEIS and related documents have also been provided directly to the following Agencies for review and comment:

**Federal Agencies:**
- Deputy Director, USDA APHIS PPD/EAD
- US Fish and Wildlife Service
- Director, Office of Environmental Policy and Compliance, U.S. Department of the Interior
- Director, Planning and Review, Advisory Council on Historic Preservation
- Division Administrator, Federal Highway Administration (WA)
- Environmental Protection Agency, Region 10, EIS Review Coordinator
- National Marine Fisheries Service, Habitat Conservationists Division, Northwest Region
- Natural Resources Conservation Service, National Environmental Coordinator, U.S. Department of Agriculture
4.3 Tribal Consultation and Coordination

A government to government scoping letter was sent to tribal staff members of the Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation on December 14, 2014, informing them of the Sunrise proposed project and requesting any comments or concerns regarding the project. The Pomeroy District Ranger presented the District Program of Work to Nez Perce tribal staff members on in the spring of 2015, 2016, and 2017, and continued to update the Nez Perce tribal staff members at subsequent opportunities. At these meetings, projects are presented the District Ranger solicits questions, comments, or requests for additional information. Several field trips were also organized with tribal staff members on June 29, 2015; December 08, 2015; and October 24, 2016 to view the project area, discuss potential treatments, answer any questions and address any concerns.

Tribes

Confederated Tribes of the Umatilla Reservation
- Gary Burke
- Eric Quaempts
- Carl Scheeler
- Teara Farrow
- Audie Huber
- Gary James
- Jeremy Wolf
- Kathryn Brighan
- Aaron Ashley
- Sully Kosey
- Rosenda Shippentower
- Woodrow Star

Niimpuu (Nez Perce Tribe)
- Mary Jane Miles
- McCoy Oatman
- Casey Mitchell
- Shannon Wheeler
- Elizabeth Arthur-Attao
- Bill Picard
- Samuel Penny
- Arthur Broncheau
- Quintin Ellenwood
- Nakia Williamson
- Patrick Baird
- Amanda Rogerson
Dave Johnson
Aaron Miles, Sr.
Emmit Taylor
Non-governmental Organizations:
  Alliance for the Wild Rockies, Michael Garrity
  American Forest Resource Council, Irene Jerome
  Blue Mountains Biodiversity Project, Karen Coulter
  Hells Canyon Preservation Council, David Mildrexler, Jennifer Schwartz
  Oregon Wild, Doug Heiken
  Sierra Club, René Voss
  The Lands Council, Mike Petersen, Jeff Juel

Commercial Enterprises:
  Boise Cascade, LLC, Lindsay Warness
  Boise Building, John Fullerton
  Guy Bennett Lumber Company, Dave Fritts, Resource Manager
  Idaho Forest Group, Bill Higgins

Individuals specifically requesting Information:
  Richard Artley                    Erik Ryberg
  Jeremy Cox                       Mark Sater
  Dean Gaiser                     Les Chapman
  John Geddie                     Phil Herman
  Robert Budig                    David Hunt
  Bret Harting                    Lyle Jensen
  Tom and Kim Hendrickson        Dave Price
  Sam Ledgerwood                  Joe Zellerhoff
  Richard Isaacson               Jean Public
  Shirley Muse                    Michael Krochta

Library Copies:
  Pendleton Library – Electronic and hard copy
  Asotin Library - Electronic and hard copy
  Lewiston Library - Electronic and hard copy
  Walla Walla Library - Electronic and hard copy
## Glossary

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AQI</td>
<td>Air Quality Index</td>
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<tr>
<td>ATV</td>
<td>All Terrain Vehicle</td>
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<td>BA</td>
<td>Biological Assessment</td>
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<td>BMP</td>
<td>Best Management Practice</td>
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<td>Biological Opinion</td>
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<td>Council on Environmental Quality</td>
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<td>CTUIR</td>
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<td>Continuous Vegetation Surveys</td>
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<td>DBH</td>
<td>Diameter at Breast Height</td>
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<td>Desired Future Condition</td>
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<td>Detrimental Soil Condition</td>
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<td>Forest Service Manual</td>
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<td>Visual Quality Objective</td>
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<td>Water Erosion Prediction Program</td>
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Definition of Terms

A

Activity fuels – Fuels generated or altered by a management activity.

Adfluvial individuals – are those which emigrate as juveniles from spawning tributaries, maturing and overwintering in lakes and reservoirs.

Affected environment - Natural environment that exists at the present time in the area being analyzed.

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 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 (range allotment) - Area designated for use by a prescribed number of livestock for a prescribed time period.

Alternative – In an EIS, one of a number of possible options for responding to the purpose and need for action.

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.

Aspect - The direction a surface faces. A hillside facing east has an eastern aspect.

B

Bankful width – The width of a stream channel measured between the tops of the most prominent banks on either side of the stream. Also refers to the width of the stream at the normal flood flow.

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.

Beneficial uses – Any of the various uses which may be made of water including, but not limited to, domestic water supplies, industrial water supplies, agricultural water supplies, navigation, recreation in and on the water, wildlife habitat, and aesthetics. The beneficial use is dependent upon actual use, the ability of the water to support a non-existing use either now or in the future, and its likelihood of being used in a given
manner. The use of water for the purpose of wastewater dilution or as a receiving water for a waste treatment facility effluent is not a beneficial use.

**Best Management Practices (BMPs)** – A practice or combination of practices that is the most effective and practical means (including technological, economic, and institutional considerations) of preventing or reducing negative environmental impacts to water pollution that may result from resource management activities.

**Big game** - Large mammals, such as deer and elk, that are hunted for sport.

**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.

**Biological diversity** - The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and ecological processes that connect everything in a common environment.

**Biological Assessment (BA)** – A document prepared by a federal agency for the purpose of identifying any endangered or threatened species that is likely to be affected by an agency action. This document facilitates compliance with the Endangered Species Act.

**Biophysical** – The combination of biological and physical components in an ecosystem.

**Board foot (bf)** - A measurement term for lumber or timber. It is the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide. Often expressed as MBF (thousand board feet) or MMBF (million board feet).

**Broadcast burn** - A prescribed fire that burns forest fuels as they are, with no piling or windrowing.

**Browse** - Twigs, leaves, and young shoots of trees and shrubs that animals (such as deer and elk) eat.

**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.

**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 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.

**Capability** – The potential of an area or land/or water to produce resources, supply goods and service, and allow resource uses under a specified set of management practices and at a given level of management intensity.
**Catastrophic wildfire** – An especially intense and widespread fire that usually, but not always, occurs in forests that are outside the historical range of variability in terms of forest structure and forest fuels due to fire suppression.

**Classified road** – See Road Definitions.

**Cavity** - A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

**CCF** - One hundred cubic feet (see CF).

**CF** - A measurement term for lumber or timber. It is the amount of wood contained in an unfinished block of wood 12 inches thick, 12 inches long, and 12 inches wide. Often expressed as CCF (hundred cubic feet).


**Channel (stream)** – The deepest part of a stream or riverbed through which the main current of water flows.

**Climax** - The stage of plant development in which vegetation is thought to be stable, self-sustaining, and self-replicating.

**Clearcutting** - A regeneration harvest method that removes all merchantable trees in a single cutting except for wildlife trees or snags. A “clearcut” is an area from which all merchantable trees have been cut.

**Closed system road** – Classified system road closed to public use. Opened to administrative use. Not decommissioned.

**Commercial thinning** – Any type of tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting.

**Community** - A group of species of plants or animals living and interacting at a particular time and place; a group of people residing in the same place under the same government.

**Compaction** – Making soil hard and dense, decreasing its ability to support vegetation because the soil can hold less water and air and because roots have trouble penetrating the soil.

**Conifer** - A tree that produces cones, such as a pine, spruce, or fir tree.

**Consultation** – A process required by Section 7 of the Endangered Species Act whereby federal agencies proposing activities in a listed species habitat confer with governing agencies about the impacts of the activity on the species. Consultation may be informal, and thus advisory, or formal, and thus binding.

**Connectivity** (of habitats) - The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either
close together or linked by corridors of appropriate vegetation. The opposite of fragmentation.

**Corridor** - Elements of the landscape that connect similar areas. Streamside vegetation may create a corridor of willows and hardwoods between meadows where wildlife feed.

**Cover** - 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 to escape from predators, rest, or feed.

**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.

**Cultural resource** - The remains of sites, structures, or objects used by people in the past (at least 50 years old); this can be prehistoric or historical.

**Cumulative effects** - Effects on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

**DBH (diameter at breast height)** - The diameter of a tree 4 1/2 feet above the ground measured on the uphill side of the tree.

**Danger Tree** – A danger tree is considered to be 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.

**DecAid** – An advisory tool that provides guidance to land managers evaluating effects of forest conditions and existing or proposed management activities on organisms that use snags, downwood, and other wood decay elements. DecAid is a statistical summary of empirical data from published research on wildlife and deadwood. Data provided in DecAid allows the user to relate the abundance of deadwood habitat for both snags and logs to the frequency of occurrence of selected wildlife species that require dead wood habitat for some part of their life cycle.

**Decommission** – Activity that results in the stabilization and restoration of unneeded roads to a more natural state. Removes the road segment from the Forest road inventory system. Decommissioning can involve: closing entrances; scarifying road surfaces, or decompacting (sub-soiling) to establish vegetation and reduce run-off; seeding to control erosion; partial to full restoration of stream channel by removing culverts and fills; and removing unstable portions of embankments.

**Desired future condition** - A vision of the long-term conditions of the land.
Direct effects – Impacts on the environment that are caused by the action and occur at the same time and place.

Disturbance - Any event, such as flood, wildfire, insect infestations, or timber harvest, that alters the structure, composition, or functions of terrestrial or aquatic habitats.

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

Duff – Organic matter in various stages of decomposition on the floor of the forest.

E

Early forest succession - The stage of vegetation or wildlife that inhabits an area immediately following removal or destruction of vegetation. For instance, grasses may be the first plants to grow in an area that was burned.

Eastside Screens – Regional Foresters’s Forest Plan Amendment (June 1995) designed to maintain options for old growth related and other species. Interim management direction establishing riparian, ecosystem, and wildlife standards for timber sales.

Ecological approach - An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

Ecology - The interrelationships of living things to one another and their environment or the study of these interrelationships. From the Greek Oikos meaning "house" or "place to live."

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.

Ecosystem health – A condition where the parts and functions of an ecosystem are sustained over time and where the system’s capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

Edge (habitat) - The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand or a ponderosa pine stand next to an aspen stand.

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.

Environmental analysis - An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social, and economic factors.

Environmental Impact Statement (EIS) - A statement of environmental effects of a proposed action and alternatives. The Draft EIS is released to other agencies and the public for comment and review. A Final EIS is issued after consideration of Public and agency comments. A Record of Decision (ROD) is based on the information and analysis in the Final EIS.
**Ephemeral streams** - Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.

**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.

**ETA – Equivalent Treatment Acres** – is a watershed cumulative effects model that calculates the acres of created openings in forested areas based on harvest prescription or other mortality. It is used as an index to represent the potential for increased water yield and peak flows as a consequence of reducing water loss by interception and evapotranspiration, or by changing snow distribution and melt rates.

**Even-aged management** - Method of forest management in which trees, usually the same species, are maintained at the same age and size and harvested all at once so a new stand may grow.

**Even-aged stands** – Stands of trees of approximately the same age. Silvicultural methods that generate even-aged stands include clearcutting, shelterwood, and seed tree.

**Exotic** - A plant or animal species introduced from a distant area; not native to the area, often particularly aggressive.

**Fauna** - The vertebrate and invertebrate animals of an area or region.

**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. These fuels readily ignite and are rapidly consumed by fire when dry.

**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-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 regimes** – The ecological effects of frequency, intensity, extent, season, and synergistic interactions with other disturbances, such as insects and disease, classified into generalized levels of fire severity.

**Fire severity or Burn severity** – Severity describes the fire-caused damage to the soil. The severity ratings (high, moderate, and low) are based on standards in Forest Service Handbook 2509.13.

**Fire-tolerant** – Species of plants that can withstand certain frequency and intensity of fire. Generally these are shade-intolerant species.

**Flora** - The vegetation of an area.
Fluvial individuals – are those which emigrate as juveniles from spawning tributaries, maturing and overwintering in large rivers.

Forage - Vegetation (both woody and non-woody) eaten by animals, especially big game and livestock.

Forage area – All areas that do not meet the definition of either satisfactory cover or marginal cover.

Forb - A broadleaf plant that has little or no woody material in it, including plants commonly called wildflowers and weeds.

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.

Forest Plan (Umatilla Land and Resource Management Plan) – A document that guides natural resource management and establishes standards and guidelines for a National Forest; required by the National Forest Management Act.

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(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.

Fuel break – A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against a wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: natural barriers, constructed fuel breaks, man-made barriers.

Fuel ladder - Shrubs, small trees, and low growing branches that allow fire to move from the ground to the tree crowns.

Fuel load – The dry weight of combustible materials per unit area; usually expressed as tons per acre.

Fuels management - The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control.
Fuel Model 1 (Short Grass) - Surface fires that move rapidly through the continuous, cured or nearly cured herbaceous fuels. Surface fuel loading, less than 3 inches in diameter, is less than .74 tons per acre. Surface fuel bed depth is 1.0 foot.

Fuel Model 2 (Timber, Grass and Understory) - Fire spread is primarily through the fine fuels, such as grass and pine needles. The stand is open where larger pine and Douglas-fir cover one-to two-thirds of the area. Surface fuel loading, less than 3 inches in diameter, averages 4 tons per acre. Surface fuel bed depth is 1 foot.

Fuel Model 5 (Low 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 less intense because surface fuel loads are light. Surface fuel loading, less than 3 inches in diameter, averages 3.5 tons per acre. Surface fuel bed depth is 2.0 feet.

Fuel Model 8 (Timber, Closed Timber Litter) - A typical stand includes a closed canopy of short-needled conifers, such as Douglas-fir. The compact litter layer consists of needles, leaves and occasional twigs. Surface fuel loading, less than 3 inches in diameter, averages 5 tons per acre. Surface fuel bed depth is 0.2 feet.

Fuel Model 10 (Timber, Litter and Understory) - Fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Fuels in this model include greater quantities of dead and down material 3 inches and greater. Crowning, spotting and torching are more frequent in this fuel situation. Surface fuel loading, less than 3 inches in diameter, averages 12.0 tons per acres. Surface fuel bed depth is 1.0 feet.

Function - The processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.

Geographic Information System (GIS) – Computer software that provides database and spatial analytic capabilities.

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.

Groundwater - Water that sinks into the soil and is stored in slowly flowing and slowly renewed underground reservoirs called aquifers.

Habitat - The place where a plant or animal finds what it needs to survive, either year-round or seasonally.

Habitat capability - The ability of a habitat to support a given species of wildlife.
Habitat type - A way of defining land areas potentially capable of producing similar plant communities at climax. In Forestry, habitat types are named for the predominant climax tree species.

For example, the Pinus Ponderosa habitat type series is habitat that typically supports climax Ponderosa Pine. A number of other habitat features can be identified using habitat types, such as aspect, elevation, climate, and use by wildlife species.

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.

Headwaters – Beginning of a watershed; unbranched tributaries of a stream.

Hiding area/cover - Vegetation capable of hiding 90 percent of an adult elk or deer from a human's view at a distance of 200 feet or less.

Historical Range of Variability (HRV) – The natural fluctuation of components of healthy ecosystems over time. In this EIS, it refers to the range of conditions and processes that are likely to have occurred prior to settlement of the project area by people of European descent (approximately the mid 1800s), which would have varied within certain limits over time.

Hydrologic Unit Code (HUC) – An area of land upstream from a specific point on a stream (designated as the mouth) that defines a hydrologic boundary and includes all of the source areas that could contribute surface water runoff directly and indirectly to the designated outlet point.

Hydrology - The study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

Indicator species - A plant or animal species that is presumed to be sensitive to habitat change. Its presence indicates specific habitat conditions are also present. Population changes in an indicator species can indicate the effects of land management activities.

Indirect effects – Impacts on the environment that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Individual tree selection - The removal of certain size and age classes of individual trees from a stand. Regeneration is allowed to naturally occur and an uneven-aged stand is maintained.

Intensity (fire intensity) - The rate of heat release for an entire fire at a specific time.

Interdisciplinary team (IDT) - A team of individuals with skills from different disciplines that focuses on the same task or project, referred to as ID Team.

Intermediate harvest - The removal of trees from a stand between the time of its formation and harvest cutting. Thinning, liberation, and improvement cuts are all types of intermediate harvest. Sometimes salvage harvests and sanitation harvests are termed intermediate.
**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.

**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 and archaeological sites. 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 of time, 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.

**L**

**Ladder fuels** – Fuels which provide vertical continuity between strata. Fire is able to carry from the surface fuels by convection into the crowns with relative ease.

**Landing** - Any place where cut timber is collected before further transport from the timber sale area.

**Landscape** - All the natural features such as grasslands, hills, forest, and water, which distinguish one part of the earth's surface from another; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

**Late forest succession** - The stage of forest succession in which most of the trees are mature or overmature.

**Litter (forest litter)** - The freshly fallen or only slightly decomposed plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers, and fruit.

**M**

**Mainstem** – The main channel of the river in a river basin, as opposed to the streams and smaller rivers that feed into it.

**Management action** - Any activity undertaken as part of the administration of the National Forest.

**Management area** – An aggregation of capability areas that have a common management direction, and may be dispersed over the Forest.

**Marginal cover** – A stand of coniferous trees 10 or more feet tall with an average canopy closure equal to or more than 40 percent but less than 70 percent and generally capable of obscuring at least 90 percent of a standing elk from the view of humans at a distance of 200 feet.

**Merchantable timber** - Timber that can be bought or sold.
**MIS (management indicator species)** - 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 (see "indicator species").

**Mitigation** - Measures designed to counteract environmental impacts or make impacts less severe.

**Mixed stand** - A stand consisting of two or more tree species.

**MBF** - Thousand Board Feet (see board foot).

**MMBF** - Million Board Feet (see board foot).

**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.

**N**

**Natural regeneration** – Reforestation of a site by natural seeding from surrounding trees. Natural regeneration may or may not be preceded by site preparation.

**Natural resource** - Water, soil, wild plants and animals, air, minerals, nutrients, and other resources produced by the earth's natural processes.

**NEPA (National Environmental Policy Act)** - An act of Congress passed in 1969 declaring a national policy to encourage productive and enjoyable harmony between people and their environment. Section 102 of the NEPA requires a statement of possible environmental effects be released to the public and other agencies for review and comment.

**NFMA (National Forest Management Act)** - A law passed in 1976 requiring the preparation of Regional Guides and Forest Plans and regulations to guide that development.

**No Action alternative** - The most likely condition expected to exist in the future if management practices continue unchanged.

**Non-system road/unclassified road** – Any continuous set of wheel tracks that exist for more than one season, and does not belong to the transportation system.
**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.

**Ongoing actions** – Actions that have been implemented, or have contracts awarded or permits issued.

**Open system road** – Classified system road, open to public use.

**Overmature timber** - Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

**Overstory** - The upper canopy layer; the plants below comprise the understory.


**Park-like structure** - Stands with large scattered trees, few or no understory trees, and open growing conditions, usually maintained by frequent ground fires.

**Patch** - An area of uniform vegetation that differs in structure and composition from what surrounds it.

**Perennial stream** - A stream that flows throughout the year from its source to mouth.

**Pre-commercial thinning** - Removing some of the trees from a stand that are too small to be sold for lumber or house logs so the remaining trees will grow faster.

**Predator** - An animal that captures and feeds on parts or all of an organism of another species.

**Preferred alternative** – The alternative identified in a draft environmental impact statement which has been initially selected by the agency as the most acceptable resolution to the problems identified in the purpose and need.

**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.

**Present net value (PNV)** [also called present net worth] - The measure of the economic value of a project when costs and revenues occur at different times. Future revenues and
costs are "discounted " to the present by an interest rate that reflects the changing value of a dollar over time. The assumption is that dollars today are more valuable than dollars in the future. PNV is used to compare project alternatives that have different cost and revenue flows.

**Public involvement** - The use of appropriate procedures to inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision making.

**R**

**Range of variability** - The fluctuation, over time, in the population, size, and components of healthy ecosystems.

**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.

**Reforestation** - The restocking of an area with forest trees by either natural or artificial means such as planting.

**Regeneration** - The process of establishing a new tree crop on previously harvested land. The term also refers to the young crop itself.

**Regeneration harvest** - A silvicultural treatment intended to regenerate a stand of trees. Shelterwood and seed tree harvests are forms of regeneration treatments.

**Resilient, resiliency** - The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages.

**Restoration (of ecosystems)** - Actions taken to modify an ecosystem to achieve a desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume its resiliency to disturbances.

**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 area along a watercourse or around a lake or pond. Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

**Riparian Habitat Conservation Area (RHCA)** – Portions of watershed where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAAs 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.

**Runoff** - The portion of precipitation that flows over the land surface or in open channels.
Salvage – Salvage timber harvest is defined as "the removal of dead trees or trees damaged or dying because of injurious agents other than competition, to recover economic value that would otherwise be lost" (Helms 1998). When a fire front passes a tree, some of the resulting heat is transferred to the vascular cambium, foliage and roots. If the temperatures are high enough and the flame residence time is long enough, these tissues are killed. When a high proportion of the cambium, crown or fine roots are killed, the whole tree dies. Lower temperatures or shorter residence times will injure tissues rather than kill them (Dickinson and Johnson 2001).

Satisfactory cover – A stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or more than 70 percent. Umatilla Forest Plan defines it as cover used by animals to ameliorate the effect of weather.

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.

Seasonally Closed Road – Classified system road closed to public use for part of the year.

Sediment – Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle to the bottom.

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.

Shelterwood harvest - A regeneration cut designed to establish a new crop of trees under the protection of the old. This type of harvest typically occurs in stages with a second entry following the first after regeneration has occurred.
Silvicultural system - The cultivation of forests; the result is a forest of a distinct form. Silvicultural systems are classified according to harvest and regeneration methods and the type of forest that results.

Silviculture - The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplish specific objectives.

Site potential – A measure of resource availability based on interactions among soils, climate, hydrology, and vegetation.

Site preparation - The general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation. Naturally-occurring wildfire as well as prescribed fire can prepare a site for natural regeneration.

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.

Smolt – Young salmon or trout migrating to the ocean and undergoing biological changes to enable them to move from freshwater streams to saltwater.

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 and thereby change it in some ways, such as in its ability to absorb 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.

Species – A population or series of populations of organisms that can interbreed freely with each other but not with members of other species.

Stability – Ability of a living system to withstand or recover from externally imposed changes or stresses.

Stand - A group of trees in a specific area that are sufficiently alike in composition, age, arrangement, and condition so as to be distinguishable from the forest in adjoining areas.

Stand composition – The vegetative species that make up the stand.

Stand density – Refers to the number of trees growing in a given area, usually expressed in trees per acre.

Stand replacement - Fire that kills upwards of 70 percent of overstory trees.

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 (multi-story).

Standards and guidelines - Requirements found in a Forest Plan which impose limits on natural resource management activities, generally for environmental protection.
**Stream morphology** – The study of the form and structure of streams.

**Succession** - The predictable, natural replacement of one plant community with another over time. The different stages in succession are often referred to as seral stages (see "seral").

**Successional stage** - A stage of development of a plant community as it moves from bare ground to climax. The grass-forb stage of succession precedes the woody shrub stage (see "seral").

**Suitability** - The appropriateness of certain resource management practices for an area of land. Suitability can be determined by environmental and economic analysis of management practices.

**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** - A cutting made in an immature stand of trees to accelerate growth of the remaining trees or to improve the form of the remaining trees.

**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 US Fish and Wildlife Service under the Endangered Species Act of 1973.

**Tiering** – In an 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.

**Total cover** – All coniferous tree cover 10 or more feet tall and with a canopy closure of equal to or greater than 40 percent (i.e. satisfactory cover plus marginal cover).

**Tractor logging** - A logging method that uses tractors to carry or drag logs from the stump to a landing.

**Transitory Range** – Land that is suitable for grazing use of a non-enduring nature over a period of time; often found in the openings created by timber harvesting activities. For example, on particularly disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

**Unauthorized or Temporary Road** – Formerly also referred to as unclassified road. These are defined as Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned traveled way, and off-road vehicle track that have not been designated and managed as a trail;
and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization. Roads not authorized or necessary for long-term resource management.

**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.

**Uneven-aged management** - Method of forest management in which trees of different species in a given stand are maintained at many ages and sizes to permit continuous natural regeneration. Selective cutting is one example of an uneven-aged management method.

**Uneven-aged stand** – Stand of trees in which there are considerable differences in the ages of individual trees.

**V**

**Vegetation management** - Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

**Vertical diversity** - The diversity in a stand that results from the different layers or tiers of vegetation.

**Viable population** - The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout their range.

**W**

**Water yield** - The runoff from a watershed including groundwater outflow.

**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.

**X, Y, Z**

**Yarding** – Hauling timber from the stump to a collection point.
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Fuels


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**Inventoried Roadless Areas (IRA), Potential Wilderness Areas (PWA), and Other Undeveloped Lands**


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**Invasive Plants**


Soils


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Visual Resources (scenery)


Appendices

Appendix A: Maps

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Appendix B: Cutting Unit Activities for Action Alternatives

Appendix C: Compliance with Eastside Screens
Appendix A: Project Maps

Map A-1: Vicinity Map

Pomeroy Ranger District
Umatilla National Forest
Sunrise Vegetation and Fuels Project
Map A- 5: Alternative C Vegetation Treatment Map

Legend:
- Project Area: 33,150 Acres
- U.S. Forest Service
- State Agency
- Other Land
- Inventoried Roadless Area (IRA)
- Asotin Creek 16,433 Acres
- Other IRA’s
- Wilderness
- Road
- Trails
- Campground
- Lookout/Cabin
- Recreation Residence
- Trailhead
- Alternative C Silviculture Prescription and Logging System
- Intermediate, Ground-Based
- Intermediate, None
- Intermediate, Skyline
- Regeneration, Ground-Based
- Regeneration, Skyline
- Temporary Roads
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<th>Alt C (acres)</th>
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<th>Primary Silvicultural cutting method</th>
<th>Primary fuels treatment</th>
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Appendix C: Consistency with Eastside Screens

General Standards (Items 1-3 in Plan Amendment #11)
The Sunrise project action alternatives are consistent with the Screens general standards because they are designed to incorporate the interim ecosystem and wildlife standards as discussed below, and incorporate the riparian standard by avoiding any tree-cutting activities within Pacfish-designated RHCAs. Items 2 and 3 are not pertinent because the Sunrise project is not claimed as an exception to Item 1.

Ecosystem Standard (Item 5 in Plan Amendment #11)
The Sunrise project action alternatives are consistent with the Screens ecosystem standards for reasons described below, with reference to the applicable required component in the Eastside Screens.

- Item 5a: Proposed timber-harvest activities were assessed relative to their associated watershed for patterns of stand structure by biophysical environment, and comparisons were made to the Historic Range of Variability (Martin 2010). The HRV was used for large landscapes across which forest types, environmental settings, and disturbance regimes are relatively uniform (Powell 2014b). The component watershed used for the sunrise analysis has a range of conditions broadly reflective of the range of conditions for which the HRV was developed (interior Pacific Northwest montane forest ecosystems). Quantified vegetation analysis was limited to National Forest System lands within the Lick Creek and North Fork Asotin watersheds. Approximately 500 acres were classified on private and state-owned lands within the watershed from adjacent Forest Service lands and using aerial photographs. The distribution of structural stages appears similar to analogous Forest Service lands, with a heavy dominance of high density old forest multi-strata forests, of Douglas-fir, grand fir, and ponderosa pine cover types. Thus, their inclusion into the quantified ecosystem analysis of this report would not noticeably alter findings, activity types, or project consistency with Forest Plan requirements.

- Item 5b: To characterize forest ecosystems relevant to the Sunrise silviculture analysis, HRV was determined in Powell 2014b (and references therein) using the first 3 steps outlined in the Screens for Item 3b. Powell 2014b is incorporated by reference into this analysis. Step 4 of Item 3b was mapped for the project analysis, and structural stage abundance was calculated by biophysical setting.

- Item 5c: Differences between percent composition of structural stages between HRV and current conditions are also reported in Section 3.6. Structural conditions and biophysical environment combinations outside of HRV conditions were assessed to determine potential treatment areas.

Wildlife Standard (Item 6 in Plan Amendment #11)
The Sunrise project action alternatives are consistent with the Screens wildlife standards for reasons described below, with reference to the applicable required component in the Eastside Screens.

- Item 6a: Multi-strata with Large Trees (OFMS) and Single Strata with Large Trees (OFSS) were assessed for all biophysical environments within the Sunrise project area.
Item 6b: LOS stages (OFMS and OFSS) were calculated separately for each biophysical environment, and Scenario A was chosen as the applicable scenario for all three biophysical environments (Most, Cold, and Dry Upland Forest).

Item 6c: The Sunrise analysis is not claiming an exemption from consideration of HRV, so this item does not apply.

Item 6d (Scenario A): None of the proposed timber harvest would result in a net loss of LOS from any of the three upland-forest biophysical environments in the Sunrise planning area. There are no timber harvest activities planned under any action alternative in LOS stages below HRV.

Some tree-cutting activities are included under Alternatives B and C for areas in LOS stages within or above HRV and are designed as intermediate or individual-tree selection cutting treatments. Such treatments are designed to maintain or enhance LOS within the pertinent biophysical environment by converting a stage above HRV (OFMS) to one currently within or below HRV (OFSS), and/or by altering density and/or species composition to improve residual tree vigor, size, and/or longevity.

Other tree-cutting activities included under Alternatives B or C are planned in areas outside of LOS with the intent to maintain and/or enhance LOS components as appropriate to meet HRV by adhering to all standards listed in the Screens amendment. These items are directly related to silvicultural design criteria related to the Eastside Screens Forest Plan amendment, described previously in this report.

- All remnant late and old seral and/or structural live trees ≥21” dbh that currently exist within stands proposed for harvest activities would be maintained
- Structure that does not meet LOS conditions would be manipulated in a manner that moves it towards these conditions as appropriate to meet HRV. Any areas treated in such a manner to move them away from LOS (e.g. seed-tree regeneration cutting activities) are included only because LOS conditions elsewhere are expected to meet HRV as a result of overall project effects.
- Where open, park-like conditions occurred historically (areas characterized by frequent, low-severity fire regimes), all treatments will be designed to maintain, or reestablish, such conditions by implementing intermediate thin-from-below treatments and/or emphasize the removal of fire-intolerant species. A sufficient number of seedlings, saplings, and poles will be maintained to allow for the development of future stands.
  a) Connectivity would be maintained and/or enhanced and fragmentation avoided because the project adheres to the following standards:
  b) Stands serving the purpose of connecting LOS stands and Forest Plan designated “old growth/MR” habitats would be maintained. These items are directly related to silvicultural design criteria related to the Eastside Screens Forest Plan amendment, described previously in this report.

  1) Activity units and prescriptions for both action alternatives were explicitly designed in such a manner that LOS stands and MR/Old Growth habitats would be connected to each other in a contiguous network from at least 2 different directions.
  2) Any activities that may occur in a connectivity corridor would be designed such that following implementation, medium and larger trees would remain common, canopy closures would remain within the top one-third of site

31 Individual-tree selection cutting is classified as a regeneration method—not an intermediate treatment.
potential, and stands would remain >400’ wide at their narrowest point.

3) Length of connection corridors is as short as possible

4) Harvests included under either action alternative and occurring within connectivity corridors would occur only if the above criteria are met, and if some amount of understory (if any occurs) is left in patches or scattered to assist in supporting stand density and cover.

c) Stands that do not currently meet LOS but are located within, or surrounded by, blocks of LOS stands are not considered for even-aged regeneration or group selection.

o Wildlife-related items:

a) Design criteria pertaining to Snags, Green Tree Replacements, and Down Logs are included in the silvicultural design criteria section above. Snags and green replacement trees ≥21 inches dbh (or whatever smaller representative dbh of the overstory layer) would be retained at levels prescribed by the project biologist. A consistency finding and rationale is also included in the project wildlife specialist report.

b) Every known active and historically used goshawk nest-site would be protected from disturbance. 30 acres of the most suitable nesting habitat surrounding all active and historical nest trees would be deferred from harvest. A consistency finding rationale for goshawks is also included in the project wildlife specialist report.

Other, Non-Screens Consistency Findings

Concerning National Forest Land Suitability, all silvicultural activities would be implemented only on lands meeting the definition of forest land (16 U.S.C. 1604) and designated as suitable for timber production by the Forest Plan (USDA Forest Service 1990), as amended. Furthermore, even-aged management components are considered to comply with Forest Plan objectives, and are restricted to 40 acres or less. All silvicultural prescriptions recommending a clearcutting activity would do so only if it is found to be an activity of last resort—only proposed when no other intermediate (preferred) or regeneration cutting method to meet stand management objectives would be appropriate or compatible with existing stand conditions. This method of determination is amenable with the Forest Plan.

Vegetation manipulation must comply with the requirements found in 16 U.S.C. 1604. These include compliance with multiple-use goals and objectives under each action alternative, acres prescribed as regeneration cutting are replanted within five years, assuring the assigned prescription is chosen for the greatest positive ecological impact and not on dollar value, consideration of effects to residual trees and adjacent stands from silvicultural prescription implementation, consideration of effects to site productivity and RHCAs by utilizing BMPs, and that action alternative silviculture activities are both practical and would provide the desired effects with respect to water quantity and quality, wildlife and fish habitat, regeneration of desirable tree species, forage production, recreation uses, aesthetic values, and other resource yields.