spotted frogs are unlikely to be dispersing, and the distance of the vast majority of project sites from permanent water, direct effects on spotted frogs would be minimized.

Aquatic and Riparian Habitat

Use of the six primary habitat elements to determine effects to threatened, endangered, and sensitive species is based upon using the effects of the action on key habitat elements as a surrogate for effects to the species. The premise is that the primary habitat elements depict the biological requirements of the threatened, endangered, and sensitive species. Since there is a direct relationship between habitat condition and the growth and survival of individual fish and sensitive species at various life stages, the effects of the action on habitat variables can be linked to effects to individuals of the species, and ultimately to an effects determination.

The Rattlesnake Project would restore upland and riparian forest health and processes and introduce disturbance-related fire effects. Rattlesnake proposed actions, in conjunction with reasonably foreseeable aquatic restoration actions, would restore riparian processes and functions resulting in a positive effect on aquatic threatened, endangered, sensitive, and management indicator species.

Cumulative Effects of the Action Alternatives

Past and ongoing action effects are mostly due to roads (including former logging railroads), past grazing, and past riparian harvest. Lesser effects may be due to current grazing, irrigation withdrawals (temperature), riparian firewood cutting (large woody debris), and fish passage and habitat restoration projects (sediment).

Ongoing grazing activities could potentially contribute sediment to streams. Thus, the cumulative effect of alternatives 2 and 3 would be a relatively small increase in total sediment production. The effect of the remaining five project elements on the remaining five primary habitat elements was either negative and not meaningfully measurable or neutral. It is unlikely that these negative and not meaningfully measureable effects would result in measurable adverse cumulative effects when considered with range management activities. With full implementation of Malheur Forest Plan grazing standards there is little likelihood of cumulative effects from grazing, since these standards are designed to allow a near natural rate of recovery of aquatic habitat and riparian vegetation. The current grazing standards are designed to eliminate any effects on aquatic habitats that could carry over to the following year.

The aquatic habitat and water quality effects of future activities are negligible, except for the ongoing actions mentioned in the preceding sentence. The effects of use and maintenance of roads which are not decommissioned would remain about the same as at present. The effects of past fish passage and habitat restoration projects would decrease after instream work is finished, and would likely be negligible within 2 years after implementation. The positive effects of fish passage would remain constant unless something impacts passage again. Stream shading may be reduced in the short term (5 to 10 years) at habitat restoration sites immediately following treatment, but are expected to return to baseline levels after that period. Measurable improvements in stream shading are expected to occur in the long term (beyond 10 years) once the synergistic benefits of the action alternatives and cumulative effects of improvements in passive riparian management are realized.

Effect Determinations

Effect determinations for threatened, endangered, sensitive, and MIS within the project area are presented below and summarized in Table 35. Determinations are made depending on Federal

Old Growth Dependent Species

Pileated woodpecker, pine marten, and three-toed woodpecker are old growth dependent species that were discussed in the MIS section of this document. White-headed woodpecker and Lewis's woodpecker are addressed in the TES section. Blue or Dusky grouse and northern goshawks are addressed in the featured species section later in this document. All these species are considered old growth associated species.

Wisdom et. al (2000) in the Interior Columbia Basin lists 29 species of terrestrial wildlife associated with old forest structure. Five species of wildlife are associated with low-elevation forest typically ponderosa pine dominated on the Malheur NF. Thirteen species, with the exception of the MIS and others previously stated, are expected to occur on the Malheur NF. Refer to the Wildlife Specialist Report for a list of old growth dependent species, their habitat, conservation measures, and probability of occurrence in Rattlesnake project area.

Nearly all old growth associated species require dead or defective habitat, such as Vaux's swift's requirement for hollow trees and bat species that use sloughing bark on snags as roosts. Other species such as the flycatchers use snag habitat for perches and catching prey. The thicker bark and more developed crowns on old forest trees provides foraging, nesting, roosting and perching habitat for wildlife species.

Direct, Indirect and Cumulative Effects of Alternative 1 (No Action Alternative)

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.

Direct and Indirect Effects from Action Alternatives

Conversion of multi-stratum old forest to less complex forests enhances habitat for wildlife preferring open stand structure. White-headed and pygmy nuthatches are examples of avian species whose habitat would be enhanced by thinning. Proposed treatments would move stands containing mature timber to old growth structure at a faster rate than no treatments. Larger trees eventually provide more quality snags in the future for bats, brown creepers, and secondary cavity nesters like flammulated owls.

Forest floor would be more open allowing seed producing plants. Prescribed fire reduces litter from conifers and enhances grasses, which harbors insects for flammulated owls and rodents, which are prey for other owls and raptors too.

Effects to snag habitat are addressed in the MIS section and these structures are expected to be reduced slightly from the proposed activities. Proposed action is expected to reduce snag recruitment a little more than alternative 3; however at the project level it is anticipated to be minimal since only firs competing directly with ponderosa pine would be harvested.

Cumulative Effects from Action Alternatives

Cumulative effects on old growth dependent species are at the watershed level. However since most of these species require snag habitat for nesting, foraging, or denning the cumulative effects are addressed in the snag section. Proposed treatments and absence of treatments in some old growth stands allow for a diversity of habitats for all these species.

Future aquatic projects may improve bat habitat by enhancing pools and improving flight corridors along stream channels.

decreasing strength of selection, elk selected for areas that restricted access to public hunters, had greater time-integrated normalized difference vegetation index values, had higher canopy cover, were farther from motorized routes, and had lower hunter effort. In rifle season in order of decreasing strength of selection, elk selected for areas that restricted access to public hunters, were farther from motorized routes, had higher canopy cover, and had higher hunter effort. Their research recommended managing for areas with > 13% canopy that are over 2,760 meters from motorized routes with high nutritional resources during archery season and during rifle season having security areas greater than 1,535 meters (~1 mile) with greater than 9% canopy from motorized routes and is >20.23 square kilometers. This research is unreasonable for most of the Malheur Forest excluding wilderness and Inventoried Roadless areas. Hillis et al (1991) recommendations for elk security were a minimum of 250 acres at least a ½ mile from open roads.

Limiting motorized travel on approximately 18 miles of road with closures and decommission would improve big game habitat especially winter range in the Cow Creek drainage which has road densities over 3 miles per square mile. This could reduce harassment, displacement, and disturbance on animals and can improve overall health of big game.

In contrast reconstruction and addition of roads reduces elk habitat especially where new roads are near potential security areas. The reconstruction of Forest Road (FS) 2830327 would reduce elk security by approximately 90 acres. Forest Road 2830327 is located near King Mountain, which is a popular elk area for hunting and has a good population of elk. Other roads such as FS 2820922 is approximately 0.6 miles in length but would affect less than 10 acres of security in the Coffeepot Creek drainage.

Don't reconstruct FS rd 2830-327 due to loss of 90 acres of elk security habitat in an area popular for elk hunting and with a good population of elk.

Table 30. Road Densities by Alternative

	Existing Condition/No Action				Action Alternatives			
	Summer Range		Winter Range		Summer Range		Winter Range	
Subwatersheds	Miles open road	Road density	Miles open road	Road density	Miles open road	Road density	Miles open road	Road density
Cow Creek	23.51	2.27	33.7	3.03	24.39	2.36	22.21	2.1
Rattlesnake Creek	9.25	1.45	13.13	2.12	8.5	1.34	12.35	1.99
Coffeepot Creek	3.91	1.71	5.82	0.94	3.92	1.71	3.19	0.52
Armstrong Canyon	na	na	8.42	1.09	na	na	8.42	1.09
Forest Plan Standards		***3.2***		***2.2***		***3.2***		***2.2***

Shading indicates not meeting Forest Plan Standards

Human disturbances associated with the roads are what affect the health and well-being of elk and mule deer. Rattlesnake project receives a fair amount of human disturbance due to close proximity to Burns/Hines. Reducing traffic can also improve fawning/calf rearing areas. This can help offset the negative effects from cover and cover complexity reduction from thinning, timber

If roads are not closed as promised, then closures can't offset negative effects from cover and cover complexity reduction from logging and prescribed fire.

Areas with Undeveloped Character

Areas with undeveloped character include acres of land that have no history of harvest activity and do not contain open forest roads and are not inventoried roadless areas, or a designated wilderness area. They are stand-alone polygons of varying acreages all less than or equal to 4,999 acres within the project area.

There are no Forest-wide or management area standards specific to undeveloped lands in the Malheur Forest Plan. All lands, including undeveloped lands, are managed consistent with Forest-wide standards and guidelines and by designated Forest Plan management area allocations.

The Rattlesnake Project Area was reviewed for areas of undeveloped character using GIS generated maps. Eighty-one individual polygons were identified as other undeveloped lands (Table 40). Many individual polygons were located both inside and outside the project area. Individual polygons of other undeveloped lands less than an acre were eliminated from further study because no special or unique resource values were identified and the description of effects to individual pieces of land less than one acre are better disclosed as part of the other resources environmental effects analysis in previous sections in this chapter. The table below shows the number, size class, and acres represented.

About thirteen percent of other undeveloped lands in the project area are considered non forest or non-vegetation. The majority of the approximate 14,902 acres of other undeveloped lands in the project area are allocated in Forest Plan management areas MA1-2 General Forest/Rangeland (3,231 acres), MA13 Dedicated Old Growth (1,433 acres), MA4A Big Game Winter Range Maintenance (8,769 acres) and RHCAs (1,027 acres), with much small portions in, MA5 Bald Eagle Winter Roost (429 acres) and MA14M Visual Corridor (13 acres). All allocations allow that timber be managed on a scheduled or non-scheduled basis, all types of prescribed fire may be used to accomplish management objectives, and road reconstruction and maintenance are permitted within Forest Plan standards and guidelines. Past management and current developed conditions within the project boundary reflect the intent and decisions made in the Forest Plan (as amended), and reflects consistency with Forest Plan management area allocations.

Any areas with unique ecological values within the project area are currently maintained for those values with Forest Plan standards and guidelines for management area allocations such as, MA4A Big Game Winter Range Maintenance, MA13 Old Growth, and RHCAs. See the EA, chapter 1, for brief descriptions of goals associated with each Forest Plan management area allocation.

No special or unique resource values in undeveloped lands have been identified by project resource specialists in their environmental analysis for the implementation of any alternative analyzed in detail. However, resources are present in these other undeveloped land such as, soils, water quality, vegetation, fuels, air quality; plant and animal communities, habitat for threatened, endangered, and sensitive species; noxious weeds, roaded modified and roaded natural recreation, semi-primitive non-motorized and motorized recreation, scenery, and cultural resources. The affected environment for each of these resources is the same as disclosed in previous sections of this chapter and not reiterated here. (*) There is no DEA consideration of the special values of undeveloped lands in that section's analysis, and the basis for the analysis The Undeveloped area maps included in the project file show that many of these areas contain closed roads. In fact, about 35 miles of closed roads are located within undeveloped areas greater than 1,000 acres. Additionally, because our GIS data only goes back to about the 1980's, and it is well known that the entire former Burns Ranger District was included in a timber sale for the

landscape, primarily on northern slopes and topographic depressions with higher availability of moisture. Some of these younger late-seral species are now greater than or equal to 21 inches diameter at breast height. The ingrowth of younger grand fir trees has increased the risk of tree mortality to old ponderosa pine due to competition induced stress, insect attacks, and uncharacteristic wildfire.

Stand densities and multi-layered canopies have also increased across the project area. Roughly 68 percent (20,333 acres) of forested ground in the project area has a basal area greater than 90 square ft. per acre, which is above the desired range, and about 34 percent (10,189 acres) has a basal area greater than 120 square ft. per acre. Stand structures in the project area currently do not reflect the desired condition based on historical references. Over stocking, drought stress, and slow growth, accompanied by stagnated stand conditions are contributing to insect activity. Currently the Rattlesnake project area is outside the historic range of variability. (HRV) Modeled results of current conditions in the project area indicate a HRV departure of 27,214 acres in the dry forest PVG. Departures are most evident in the old forest single-stratum. See chapter 3, Forest Vegetation section for more information.

The Rattlesnake project area has a high fire risk based on past starts. Existing fuel conditions are a result of effective fire suppression for the past 75 to 100 years, timber harvest, and livestock grazing. There has been an increase in understory vegetation and an increase in surface fuels, a change in species composition, and an increase in the continuity of vertical and horizontal stand structure. As a result, the potential for crown fire has increased.

The fire return interval for Dry Upland Forest is commonly accepted to be between 12 and 20 years (Heyerdahl and Agee 1996, Johnston et al. 2017). Forested stands in the Rattlesnake project area have missed several fire cycles based on the known fire return intervals and many of these stands would not burn as a low severity surface fire. Tree densities are also much higher and species composition has shifted to have a higher proportion of shade tolerant, fire susceptible fir. Insects and disease are also contributing to tree mortality in the area which contributes to surface fuel loading as trees fall to the ground. Future fires would be mixed severity to stand replacing with detrimental effects to other resources that did not historically occur.

As a stand becomes dense, active crowning occurs at lower wind speeds and the stand is more vulnerable to crown fire (Reinhardt et al. 2003).Through past harvest activities and the effects of fire exclusion, stand structure over much of the project area has shifted from primarily single storied stands with large trees to densely stocked stands with multi layered canopy of mid-size and small trees. These multi layered canopies favor mixed severity and stand replacement fire effects. Higher proportions of less fire dependent tree species such as grand fir have been recruited into the understory. This species exhibit very dense crowns and grow in tighter spacing than the more fire dependent ponderosa pine and western larch. Much of the stands in the project area have smaller grand fir growing as ladder fuels underneath the mature over story.

Declines in the health and distribution of aspen stands across western North America have been well documented (Smith AE, and Smith FW 2005) (Rogers 2002) (Calder, Horn, and St Clair 2011) (Rehfeldt, Ferguson, and Crookston 2009). Much of this decline is attributable to conifer encroachment, the absence of natural fire regimes, as well as historical and current heavy browsing of aspen suckers by domestic and native herbivores (Bartos and Campbell 1998) (Jones, Lile, and Tate 2009) (Pierce and Taylor 2010) including in central Oregon (Seager 2010) and the Blue Mountains (Seager et al. 2013). With very few exceptions, aspen stands in the Blue Mountains have been declining in number, area, and stocking. Aspen is a widespread yet uncommon species in the Blue Mountains. An inventory of approximately 25 percent of the

greater than 21 inches d.b.h. Amendments have been distributed across the forest to accomplish a variety of specific purposes including; reducing the spread of insects and disease, aspen restoration, fire salvage, rock pit expansion, restoring historic tree species composition and improving the survivability of older trees. Recent projects have been proposed to shift species composition, protect old ponderosa pine and western larch, and restore unique habitats (for example, aspen).

The effects of removing trees greater than or equal to 21 inches DBH in several past projects such as the 1996 Parish Timber Sale, 1997 Clear Creek project, and 1997 Badger Timber Sale have likely recovered with the growth and development of additional large trees over the last 20 years.

This proposed forest plan amendment would allow removal of live, young (less than 150 years old), relatively large (greater than or equal to 21 inches DBH but less than 30 inches DBH) grand fir trees in the dry upland forest where commercial thinning is proposed (approximately 3,802 acres) for alternative 2 and the removal of live conifer trees greater than or equal to 21 inches DBH but less than 30 inches DBH within 149 acres of aspen stands.

Reasonably foreseeable projects which could include forest plan amendments to remove trees greater than or equal to 21 inches diameter at breast height include the Camp Lick project (4,700 acres), Ragged Ruby project (3,350 acres), and the Cliff Knox and Austin projects, which have no indication of acres.

At the scale of the Harney-Malheur Lakes subbasin there have no other previous amendments authorized. Therefore, there would be no cumulative effects at the Harney-Malheur Lakes subbasin scale.

At the scale of the Emigrant Creek Ranger District there have been three previous amendments, Badger Timber Sale (1997 for approximately 92 acres of aspen), Wolf Vegetation Management Project (2015 for approximately 35 acres of aspen), and Flat Vegetation Management Project (2018 for approximately 147 acres of aspen). The Badger Timber Sale, was authorized in 1997, which has likely recovered with the growth and development of additional large trees over the last 22 years. Therefore, the effects of the Badger Timber Sale likely do not overlap temporally. The Rattlesnake Project (alternative 2) would increase the acres impacted on the Emigrant Creek Ranger District from approximately 182 to 4,133 acres; resulting in approximately 0.7 percent of the 634,096-acre Emigrant Creek Ranger District having been impacted. Alternative 3 would increase the acres impacted on the Emigrant Creek Ranger District from approximately 182 to 331 acres; resulting in approximately 0.05 percent of the Emigrant Creek Ranger District having been impacted.

At the scale of the Malheur National Forest there have been 12 previous amendments, three of which were authorized in 1996 and 1997 (Parish Timber Sale, Clear Creek – 91B, and Badger Timber Sale), and which have likely recovered with the growth and development of additional large trees over the last 20 years. Therefore, the effects of these projects likely do not overlap temporally. The Rattlesnake project alternative 2 would increase the acres impacted on the forest from approximately 36,152 to 40,285 acres; approximately 2.4 percent of the 1.7 million acre Malheur National Forest.

All other past or ongoing projects with amendments to remove trees greater than or equal to 21 inches DBH on the Malheur National Forest are located in different geographical areas than the Rattlesnake project.

Cumulatively, the acres on which a person may see trees greater than or equal to 21 inches diameter at breast height would be increased with this amendment. Over time, the quality of trees greater than or equal to 21 inches diameter at breast height would be enhanced and be more representative of historical conditions. One of the goals of removing relatively young (less than

change would be negligible. In addition, because the direct and indirect effects would be negligible, the action alternatives contribution to cumulative effects on global GHGs and climate change would also be negligible. Lastly, carbon emissions during the implementation of the action alternatives would have only a momentary influence on atmospheric carbon concentrations, because carbon will be removed from the atmosphere with time as the forest regrows, further minimizing or mitigating any potential cumulative effects.

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) summarized the contributions of global human activity sectors to climate change (IPCC 2014). From 2000 to 2009, forestry and other land uses contributed just 12 percent of the human-caused global CO_2 emissions[20]. The forestry sector's contribution to GHG emissions has declined over the last decade (IPCC 2014, Smith et al. 2014, FAOSTAT 2013). The largest source of GHG emissions in the forestry sector globally is deforestation (Pan et al. 2011, Houghton et al. 2012, IPCC 2014), which is defined as the removal of all trees to convert forested land to other land uses that do not support trees or allow trees to regrow for an indefinite period of time (IPCC 2000) (e.g., conversion of forest land to agricultural or developed landscapes). However, forest land in the United States has had a net increase since the year 2000, and this trend is expected to continue for at least another decade (Wear et al. 2013, USDA Forest Service 2016). Estimates of forested area on the Malheur National Forest have also slightly increased since the year 2000. This hazardous fuel reduction project is not considered a major source of GHG emissions. Forested land will not be converted into a developed or agricultural condition or otherwise result in the loss of forested area. In fact, forest stands are being retained and thinned, harvested, and prescribed burned to mimic natural fire effects to maintain a vigorous condition that supports enhanced tree growth and productivity, thus contributing to long-term carbon uptake and storage. In 2010, forests in the United States removed about 757 megatonnes[21] of CO_2 from the atmosphere after accounting for natural emissions (e.g., wildfire and decomposition) (US EPA 2015). Some assessments suggest that the effects of climate change in some United States forests may cause shifts in forest composition and productivity or prevent forests from fully recovering after severe disturbance (Anderson-Teixeira et al. 2013), thus impeding their ability to take up and store carbon[22] and retain other ecosystem functions and services. Climate change is likely already increasing the frequency and extent of droughts, fires, and insect outbreaks, which can influence forest carbon cycling (Kurz et al. 2009, Allen et al. 2010, Joyce et al. 2014). In fact, reducing stand density, one of the goals of this proposed action, is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Joyce et al. 2014). This project is consistent with options proposed by the IPCC for minimizing the impacts of climate change on forests, thus meeting objectives for both adapting to climate change and mitigating GHG emissions (McKinley et al. 2011).

Forests have a "boom and bust" cycle with respect to carbon, as forests establish and grow, experience mortality with age or disturbances, and regrow over time. Forest management

[20] Fluxes from forestry and other land use (FOLU) activities are dominated by CO_2 emissions. Non-CO_2 greenhouse gas emissions from FOLU are small and mostly due to peat degradation releasing methane and were not included in this estimate.

[21] A megatonne is one million metric tons; equal to about 2.2 billion pounds.

[22] The term "carbon" is used in this context to refer to carbon dioxide.

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[22] The term "carbon" is used in this context to refer to carbon dioxide.

* The DEA climate change analysis is extremely biased toward supporting continued F-S heavy logging. This analysis fails to consider much of the Best Available science on climate change (see our science exhibits as part of our objection) and is grossly inadequate analysis which fails to disclose the actual CO_2 emissions budget of the Rattlesnake project and the negative cumulative effects this could have on wildlife, moisture retention, hydrologic flows, future carbon sequestration & storage by trees in the area, future soil carbon storage, & local communities (e.g. increased droughts, floods, more severe storms, increased wildfire severity, local quality of life, & economic impacts)

* There is a net loss of mature & large trees in the U.S.*?

The EPA finding (2015) is a reason to retain more forest, not remove it.

* The heavy logging proposed in the Rattlesnake area is not consistent w/ IPCC recommendations to decrease climate change effects

Proposed basal area retention is so low for the Snake area is so extremely low as to equate recommended for deforestation or forest liquidation, not just beneficial thinning. Such heavy logging impairs forest resiliency to climate change & [illegible]

for supporting forest health in a changing climate and reducing GHG emissions over the long term.

In summary, this project affects a relatively small amount of forest land and carbon on the Malheur National Forest and, in the near term, might contribute an extremely small quantity of GHG emissions relative to national and global emissions. This project will not convert forest land to other non-forest uses, thus allowing any carbon initially emitted from the proposed action to have a temporary influence on atmospheric GHG concentrations, because carbon will be removed from the atmosphere over time as the forest regrows or will transfer carbon to the product sector where it may be stored for decades and substitute for more emission intensive materials or fuels. The action alternatives are consistent with internationally recognized climate change adaptation and mitigation practices.

Other Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare environmental assessments concurrently with and integrated with other environmental review laws and executive orders." The following sections disclose those laws and executive orders.

Clean Water Act of 1982

All action alternatives would meet and conform to the Clean Water Act as amended in 1982. This act establishes a non-degradation policy for all federally proposed projects. All action alternatives meet anti-degradation standards agreed to by the state of Oregon and the Forest Service, Region 6, in a Memorandum of Understanding (Forest Service Manual 1561.5). This would be accomplished through planning, application, and monitoring of Best Management Practices (BMPs). Site-specific BMPs have been designed to protect beneficial uses. See Aquatics and Water Quality sections for detailed analysis.

Conflicts with Plans and Policies of Other Jurisdictions

In Oregon, city and county comprehensive management plans are designed to carry out statewide planning goals. County plans recognize the National Forest as "primary forest," "timber/grazing," or similar designation. Although counties do not have responsibility for regulating use on Federal lands, the Forest Service and county governments attempt to coordinate planning efforts to avoid conflicts.

The alternatives discussed in this environmental assessment are generally compatible with the Harney County Comprehensive Plan (2009) and the Grant County Comprehensive Plan (1996) and statutes. Both county comprehensive plans were reviewed to determine consistency with the alternatives and were determined to be in conformance with NFMA which requires the responsible official to "provide opportunities for the coordination of Forest Service planning efforts…with those of other resource management agencies."

Therefore, there are no known conflicts with plans or policies of other jurisdictions associated with implementing the alternatives. The FEIS for the Forest Plan (chapter 4, pages IV 85-89) discusses this in further detail.

There are no known RS2477 claims for any roads proposed for access changes in the project area.

Ecologically Critical Areas

There are no ecologically critical areas in the project area.